THE AMERICAN GAS LIGHT JOURNAL

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Correspondence.—Wishing to make this JOURNAL a gazette of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, correspondence is solicited for publication from all who make the study of those subjects a pleasure or a profession.

The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

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[OFFICIAL NOTICE.]

Where to Find the Western Gas Association's Exhibit, and the Custodian Thereof, at the World's Fair.

To the Fraternity: The exhibit of the Western Gas Association, at the World's Fair, St. Louis, is located in Section 33A, Liberal Arts Building, where Mr. Fred. R. Persons, who is in charge of the same, will always be on hand to receive visitors and to explain anything that requires explaining.

[OFFICIAL NOTICE.]

Twenty-Seventh Annual Meeting, Western Gas Association.

OFFICE OF SECRETARY,
NEW ALBANY, IND., May 19th, 1904.

The Twenty-seventh Annual Meeting of the Western Gas Association will be held at St. Louis, June 14, 1904, and will be called to order at 10 o'clock A.M., by the President, Mr. F. H. Shelton, of Philadelphia.

The sessions of the Association will be held in the Gas Exhibit Department of the Louisiana Purchase Exposition, which is under the direction and control of the Western Gas Association.

On June 15th and 16th will be held the sessions of the Gas Congress of all American Gas Associations, of which the Western Association is a member.

On account of the Western's session being limited to one day, the paper list will be as follows:

"Low Candle Power Gas," by Mr. William Henry White, of New York.

"Coal Projectors," by Mr. F. H. Shelton, of Philadelphia, Pa.

"Wrinkle Department," Edited by Mr. Wm. E. Steinwedell, of Cleveland, O.

Railroad Rates.—The railroads composing the various Passenger Associations have granted rates to St. Louis during the Exposition cheaper than those granted on the certificate plan. There are several classes of rates, as follows:

Central Passenger Association, covering the territory bounded on the North (with the exception of the State of Michigan) by the Great Lakes between Chicago and Buffalo; on the East by Pittsburg and Buffalo; on the South by the Ohio river; on the West by Chicago, the Illinois and Mississippi rivers.

Season tickets, good from April 15th to December 15th, 1904, at 80 per cent. of usual rates; 60-day tickets, 80 per cent. of usual rates, where single way tickets amount to less than $3.75. One and one-third fare for round trip where the usual one way rate is more than $3.75.

One and one-fifth rate tickets, good for 10 days for round trips from points from which one fare is $8 or more. The remaining Passenger Associations, comprising nearly all the territory outside of the Western Passenger Association, announce rates as follows: Season tickets 80 per cent. of double one-way rate; 60-day excursion tickets, 1½ fare for round trip; 15-day excursion, rate one fare plus $2 for round trip ticket.

The Southeastern Association, however, where the distance is more than 350 miles from St. Louis, charges one fare plus $2.25 for round trip ticket.

A consultation with the passenger agents in the various localities will secure rates to St. Louis, with the privilege and restrictions imposed by the different rates obtainable.

The Hotel Jefferson will be the Association's headquarters, and Mr. E. G. Cowdery, Chairman of the Committee of Arrangements, announces that "The Committee will be represented at all times, in this location, by efficient help to be of assistance to delegates in any way they can."

LIBRARY OF CONGRESS
MAY 23 1904
SMITHSONIAN DEPOSIT

The Committee of Arrangements announce rates at the variou Hotels as follows:

Hotel Jefferson: $7 to $12 per day for room; privilege given for two persons to occupy a room.

Planters' Hotel: $3 per day per person; European plan. The hotel will place four persons to a room.

St. Nicholas Hotel: $7 per day and upward per room; European plan. Two persons privileged to occupy a room.

St. James Hotel: $7 per day per room, with privilege of two to four persons to each room.

The "Inside Inn," located upon the Fair Grounds, offers the following rates:

European Plan Includes Lodging and Daily Admissions.	Number of Rooms.	American Plan Includes Lodging and Daily Admissions.
$1.50 a day.....	500	.....$3.00 a day.
2.00 "	500	..... 3.50 "
2.50 "	500	..... 4.00 "
3.50 to 5.50 a day....	500 with bath	....$5.00 to 7.00 "

Single meals: Breakfast, 50 cents; luncheon, 50 cents; evening dinner, 75 cents. *A la carte* service at moderate prices.

Persons desiring to join the Association will have application blanks mailed to them upon application to the Secretary.

JAMES W. DUNBAR, Sec'y.

[NOTICE.]

Congress of American Gas Associations.

SECRETARY'S OFFICE,
58 WILLIAM ST., N. Y. CITY,
May 4, 1904.

The following Associations have agreed to participate in the Congress of American Gas Associations, to be held in St. Louis, June 15th and 16th: American Gas Light Association, New England Association of Gas Engineers, Western Gas Association, Pacific Coast Gas Association, Ohio Gas Light Association, Southwestern Gas, Electric and Railway Association, Michigan Gas Association, Wisconsin Gas Association, Kansas Gas, Water and Electric Light Association, Society of Gas Lighting, Guild of Gas Managers. The concurrence of all these Associations insures a successful Congress.

The following papers have been definitely promised:

"The Labor Question," by F. H. Shelton, Philadelphia, Pa.
"Gas Association Work," by Henry L. Doherty, New York city.
"Station Meters," by Donald McDonald, Albany, N. Y.
"Gas Inspection," by Ira C. Copley, Aurora, Ills.

It is intended to secure also either a paper, or a series of short papers, on the subject of "Inclined Retorts versus Horizontal Retorts Operated by Machinery."

A. E. FORSTALL, Sec'y.

[OFFICIAL NOTICE.]

Wrinkle Department, Western Gas Association.

WESTERN GAS ASSOCIATION,
OFFICE OF EDITOR, WRINKLE DEPARTMENT,
CLEVELAND, O., April 5, 1904.

This department is now open and ready for contributions, which will be presented at the Twenty-seventh Annual Meeting, to be held next June in St. Louis, Mo.

The active co-operation of all members and friends is earnestly solicited. Please forward contributions to the Editor at once.

W. E. STEINWEDELL, Editor.

BRIEFLY TOLD.

DEATH OF GENERAL ANDREW HICKENLOOPER.—While for well more than a year it was known that the health of General Andrew Hickenlooper was in such precarious state that his death might be reached at any moment, it is nevertheless true that the final word found those who knew him unprepared for the last message. The General passed away peacefully, at his home in Cincinnati, the 12th inst. His death marks the end of a natural life that was complete for work well done in many and varied ways, and out of them all shines best his services to the gas industry of America. Born August 10, 1837, his almost three-score-and-ten span makes a book the like of which is seldom written of any man. Our Item columns for the week contain a report of the action taken by the Cincinnati Gas and Electric Company respecting the thought of his associates, and in due time we will publish some authentic record of his career, the recital of which will be like a compendium of the gas business of the country, the development and upholding of which can be said to have been his guiding star.

SPECIAL EDITORIAL CORRESPONDENCE ANENT THE WORLD'S FAIR.—The following from St. Louis, Mo., dated May 14th, which is forwarded by correspondents "competent to know and declare," explains itself:

Dear JOURNAL: We are going to ask the courtesy of your columns to state as briefly as possible what we have seen at the St. Louis Fair, in the hope that perhaps manyof your subscribers and our personal friends will learn in some way from us of the magnitude of this Exposition, feeling that in doing so we may possibly influence all of the gas men to go to St. Louis in June to attend the Gas Congress.

We have been in St. Louis for three days, and before arriving we felt, as perhaps many others feel, that we would be up against all kinds of extravagant prices, and would not be repaid by the sights as presented. That we were most agreeably disappointed goes without saying. In the first place, the grandeur of this Fair is beyond description, and in almost every particular it is finished and ready, the only exception being that, in some cases, a few of the exhibits have not as yet been placed; but as the work on these exhibits is discontinned during the day hours, the only work being done during the night in arranging exhibits, the public is put to no inconvenience, and every building is of such magnitude in itself that one fails to notice the very small percentage of exhibits not yet finished.

The grounds and buildings from the outside, however, are perfect. All the grounds are beautifully laid out, with handsome horticultural effects, enhanced by well constructed driveways and artistic water courses, etc. All the buildings are fresh, beautiful and magnificent. Particularly so is this true at night when all these buildings, covering acres of ground, are illuminated in one glowing, radiant beanty with good illumination. Standing in the center of the main court, looking up toward the cascade, the sight at night is beyond my description. It impresses one with wonder and awe, that eventually leads to a true conception of the greatness of the enterprise. Its effect on us was such that we at once became enthusiastic and warmed up to a true knowledge of the colossal undertaking, the achievement of which proves the heights to which those who thought it and planned it have attained.

Other things connected with the Fair, is especially the Pike, which starts at one end with a $600,000 structure, in which you enter feeling that you are in the midst of the Tyrolean Alps, are equally beautiful. As this reproduction is so perfect, with the vast peaks and their snow-topped caps rising against the blue sky, that even the atmosphere seems different in this inclosure than it is at any other place in the Fair. Going up about a mile, this Pike presents various forms, styles and kinds of amusement. Their entertainments are complete and are modest, yet they represent most of the nationalities of the world, and it is impossible to attempt to fully impart to other minds what one gathers as he passes through this wonderful maze of the buildings arranged and designed by the various nations.

Thus we have tried to show in a few words what the Fair represents to those who see it. As far as the hotel accommodations are concerned and the means of transportation to and from the grounds, they seem to be as perfect as can be. Anyone can stop at the various inns, boarding houses or hotels at prices ranging from $1.50 and $2 up to $10 or $12 per day. But all are good, and anyone visiting the Fair can naturally arrange his quarters or locate himself according to how he feels with regard to the payment of his rooms.

There are innumerable places on the Fair grounds where very good meals can be procured, well served, and at moderate prices. There is no disposition whatever on the part of any of the hotel people or restaurant keepers to try to "gouge" the public. Their service is good, and we could only come to the conclusion, after 3 days at the Fair, that it would be possible for anyone to go and live according to his means. and receive such attention as would be looked for in any first-class city. As the weather will be about as perfect in June as at any other season of the year, we believe, in addition to the Gas Congress which meets, it would be worth the while of anyone to make a special effort to visit this Fair, the like of which will probably never be reproduced.—C. H. D.; D. J. C.

HOME AGAIN.—Captain William Henry White, whose absence from the gas arena has been sorely missed for several weeks—nay, months—is back again, safe and sound, from a prolonged Eastern journey. He is hale and hearty, and later on his associates will hear from him real tales of how many chances are available for the construction and operation of gas plants in the far East. Welcome home, Captain!

[Revised by the Secretary.—Continued from page 771.]

TWENTIETH ANNUAL MEETING, OHIO GAS LIGHT ASSOCIATION.

Held in the Hollenden Hotel, Cleveland, O., March 16, 17 and 18, 1904.

Second Day—March 17.—Afternoon Session.

The President—We expected that the Question Box would be given the entire afternoon, as its consideration would seem to warrant, but the discussion on the subject just closed took up more time than was anticipated. It gives me great pleasure to put the

QUESTION BOX

before you. Editor Doherty has the floor.

Mr. Doherty—I doubt if I can do better than to read the preface to the Question Box, and then suggest, if there are any questions you want to discuss, that they be brought up later, because I doubt if any of you have seen the Question Box, and, therefore, you cannot tell what you do want to hear discussed. There is more here than we could discuss fully between now and next June.

Editor Doherty read as follows:

After another year's experience as editor of the Question Box, I am less certain of its value than I was a year ago. I have received many criticisms, compliments, suggestions and comments regarding its value, the methods employed and changes which should be made. This year's Question Box will contain approximately double the number of contributors and double the number of contributed answers. Certain information to contributors of questions and answers can be best offered here as a means of guidance for next year's contributions. The questions asked should be as practical as possible. They should also be as definite as possible, and cover all essential information required by those who might be induced to attempt an answer. The questions should cover: First, any information desired; second, questions intended to expose popular error; and third, questions for the purpose of introducing new knowledge not of sufficient extent or importance for the production of a paper.

Those answering questions should express something more than an assertion and, wherever possible, should give the reasons for their answers in a way that could be understood by any reader, whether possessing an extensive education or not, or by the newest man in the gas business. The answers should be as brief and concise as possible; in fact, as brief and concise as a cablegram, but simplicity and clearness are more desirable than brevity. If the question asked does not give all necessary data for its answer, assume the most natural conditions, state the premises you have assumed and answer on that basis. The answer can generally be applied by the person wanting the information, and is very apt to prove of value to others even if not valuable to the questioner.

It is sometimes the critic who contributes the most improvement to a movement of this sort, and, therefore, criticisms are always welcome, but they should be offered in good faith and not without consideration. Some of the criticisms have been so marked as to leave the impression that the critic had a grievance against the Ohio Gas Light Association for starting this movement and a particular grievance against the Editor for lack of sagacity and industry. To the following general criticisms I wish to make definite answer:

1. Many questions are ambiguous and indefinite.
2. The questions are not new and their answers can be found in other published gas literature.
3. Questions are not properly answered and should contain all of the writer's reasons for his answer.
4. Many questions are wrongly answered and are liable to lead the unknowing ones astray.
5. The answers to questions should receive the stamp of approval of the Association.
6. Questions should be collected before the convention meets and answered on the floor.

There is some merit in some of these criticisms, but many of the criticisms and suggestions for betterment are absolutely improper, and are the result of a load being shot off out of a gun having a hair trigger.

The first criticism, that "Many questions are indefinite and ambiguous," is certainly correct; but the questions are often asked by men who do not know how to put the question. One does not know exactly what they want to get at, and any suggestion for a more definite question is apt to cause its withdrawal. The ambiguity of questions seems almost unavoidable. The plainest sort of a question will sometimes be interpreted by some of the contributors of answers in a way entirely foreign to the understanding of the question by its author or by the Editor. Many of the questions which appear the most obscure are asked by capable and competent engineers, and are often put in a form which shows some thought in preparation, although leaving opportunity for doubt regarding the information wanted.

The second criticism, that "The questions are not new and their answers can be found in other published gas literature," is also a true criticism, if it is a criticism. The fact that the question is asked would indicate that this knowledge was not general, or that, perhaps, as the question is answered in other gas literature someone may consider the answer an improper one, or he does not fully understand it, or for some reason is not fully satisfied with it. Many answers have been received ridiculing certain questions. One young engineer orally criticized a certain question which, upon investigation, I found had been asked by his chief engineer, who is a man he greatly admires. Some of the questions are not as foolish as they look, and are not asked by inexperienced or ignorant men.

The third criticism, that "The questions are not properly answered and should contain all of the writer's reasons for his answer," is a bit too sweeping to be true. It, however, would be desirable to know the reasons for certain answers, and the Editor has attempted to secure these in many cases for this year's publication. To the critics who have made this their most prominent criticism, I wish to say that it is not an easy matter to get any answers whatever, and the Editor is very thankful for answers sent him and is sorry that others did not contribute incomplete answers rather than make no contribution at all.

Regarding the fourth criticism, that "Many questions are wrongly answered and are liable to lead the unknowing ones astray," I am inclined to think that it is partially a meritorious criticism. The Editor professes his inability to correct all of these errors, and it would seem rather presumptuous for him to attempt to censor all the answers offered. The questions may be erroneously answered, or they may be incompletely answered, but at least a record is furnished of names and addresses of men with whom correspondence can be opened for further information or for their reasons for the answers they gave.

The fifth criticism, that the "Answers to questions should receive the stamp of approval of the Association," I do not think is a proper one. I do not see that the Association can stamp these answers with their approval, nor do I think that an assemblage of men would have any greater wisdom than these same men have in their own offices. My own belief is that written discussion, which need only be offered after mature thought, is of greater value than impromptu discussion on the floor of a convention hall.

The sixth criticism, that "Questions should be collected before the convention and answered on the floor," is absolutely impracticable. A mailing list of over 1,600 names has been used to collect the questions and answers published. How could this same information be obtained from say 300 men assembled in a convention, with their time limited and not many more than 100 in the room at any one time? Those making this criticism do not appreciate the enormous expense of a convention and the limited time at the disposal of those attending it. I think it is safe to assume that the travelling expenses and hotel bills of each delegate are not less than $50 on the average. Assume that 300 attend the convention and the expense is $15,000. If they put in 5 hours each day at the convention hall for 2½ days, their time is worth about $20 a minute and can be more profitably employed if answers to these questions are solicited in advance.

Suggestions for improvement have been few and indefinite. Compliments have been more numerous than criticisms, and to those who have spoken a word of encouragement I would say I think I can assure them that they have helped out the good work in counteracting the depressing effect of the indifference shown by others.

I do not think the gas men of the country appreciate the work, worry and expense of this undertaking, or they would accord it greater support. The Question Box in its present form is not perfect and never will be, but it is hoped that improvement will continue. It, however, should cause every reader to do some serious thinking and should inspire study and investigation on the part of some.

It offers a means of locating valuable engineering data and also to bring out talent not heretofore known or associated with any of the Gas Associations. It is bound to expose many popular errors and secure their correction, and will suggest material for Association programmes and investigation and research work. It offers an avenue for the information possessed by one to be made common to all, and matters of insufficient importance for the creation of a paper may find a suitable outlet through the Question Box. It offers an opportunity for every

man in the gas business to offer some contribution for the good of the fraternity, and by giving an opportunity for the contributions to be prepared in advance, mature consideration and judgment can be applied. It should prove of value to every man having time for research and investigation work, to gas publications and to students, if for no other reason than the many suggestions which it contains.

Every reader of this publication is sincerely requested to offer in detail: First, his criticisms; second, his suggestions; third, methods which occur to him for its improvement; fourth, an estimation of its value and how this value may be increased. It is also desired to know how a more general participation may be secured and particularly from those best able to contribute. The Question Box is a sort of a popular institution, and I fear some of our ablest men consider it beneath their dignity to lend their assistance.

The expenses of the publication have this year been borne by advertisers. The expenditure for the postage and stationery alone in this work is considerable, and beyond the means of the Association. Either individual members of the Association or advertisers must bear these expenses. The book should prove a good medium for advertising, nor should its value, in any other respect, be lessened thereby. An invitation to advertise in the publication brought prompt and almost unanimous favorable responses.

In closing, I wish to explain, not by the way of apology, but in justice to the plan, that the Editor has been extremely busy and has been unable to devote the proper amount of time demanded by the work, having spent fully three-quarters of his time during the period of its preparation in cities other than the one to which his mail was addressed.

For valuable assistance rendered, the Editor wishes to thank Messrs. Paul Doty, M. E. Malone, J. Chas. Andrews and Miss Josephine Baehr, all of the Denver Gas and Electric Company; also Irvin Butterworth, Manager of the Detroit City Gas Company.

I can find no adequate words in which to express my thanks to the contributors to this publication. Their contributions are sincerely appreciated and the evidence of their desire to support the movement is still more keenly appreciated.

The Question Box was then submitted in its integrity, after which the Editor said:

I want to make a general statement with reference to the Question Box. I intended to have a digest ready for this meeting but have been unable to prepare it. It was also our plan to send the Question Box out well in advance of the meeting. We started early enough to do that but the answers to questions which were promised us by February 1st were not secured. I can appreciate how difficult it is, and would like to impress it upon every member of this Association, how difficult it is for a Secretary, or any man attempting to get data together, to secure the work in time to be utilized; and I would impress upon all contributors the necessity for getting all matter in as early as possible. They seem to think the convention is a long way off, and only wake up at the last minute. A great deal of the matter that is included in this Question Box was not and could not be secured in time to send it out in advance. If I have anything to do with the Question Box next year I intend to start, if necessary, in May, to have it in the hands of the members before the convention meets, because we would derive its chief value in that way, both by discussion on the floor and discussion among the members outside of the convention hall. In this Question Box I think there is a great deal of interesting information. No man can read it and not have his mind at least directed to a new line of thought. I have been in the gas business a good many years and in varied sorts of ways, and even the asking of certain questions brings up matters that are to me entirely new, and they often come from men who I know are very new in the business. Yet their view-point causes them to ask these questions which are calculated to make an old gas man think. We have divided the Question Box into various departments, such as manufacture, distribution, etc. Perhaps some better arrangement can be suggested. This year we have three indexes. The first index is an index to the contributors of answers. It shows the man answering the questions, who are then designated by a number, and the questions to which they have furnished answers are indicated by the numbers of questions following their names and addresses. The second index is an index to the questions, and following the questions are the page numbers; and the contributors are designated by their number which corresponds with the number in the first index. The third index is a subject index; so, if it is desired to see whether the Question Box touches upon any particular subject, the subject index can be looked at first and that will show the number of the question and the page on which it will be found. If there is anything that I could say at this time which would give this Question Box better support from the members of the Ohio Gas Light Association and the members of the fraternity I would like to say that thing. The trouble is, I do not know what to say and how to say it; but I have probably hundreds of letters urging continuation and the expansion of the Question Box idea. Some of them have come from abroad. One particularly was in a foreign language, and I had to have the letter translated to see what it said. Now with the number of people asking to have it continued and to have the idea expanded upon, if that is possible, in justice to them, if for no other reason, it ought not to be dropped. If it is good enough to carry on, it is good enough to carry on well. It is not within the province of your Editor to carry on this work except with the co-operation of a great many men. He can only do the planning, the actual work of editing, etc. The succcess of the Question Box depends upon your co-operation, and co-operation is valuable to the degree to which it extends, and becomes more and more valuable the more extensive it is, even in greater ratio than the exact proportion of men contributing. That is all I have to say, Mr. Chairman. If any one has any criticisms or suggestions I would be very glad to hear them.

The President—There can be no real criticism of such admirable work as this, and I think it is only fair to say that Mr. Doherty has furnished a very valuable contribution in the annals of gas literature. He has performed an inestimable service for the Ohio Gas Light Association.

Mr. Doty—Mr. President, I simply desire to call attention to a fact which must be most encouraging to the Editor of the Question Box, and also to the Ohio Gas Light Association, that there are no less than 149 separate names mentioned as contributors, besides a few modest men who sign their names "Anonymous." It seems to me this is a marvelous awakening of interest and certainly a magnificent testimonial to the work of the Ohio Gas Light Association. I think, when this work becomes better known, the men who are in the gas industry in this country and elsewhere will consider it a privilege to have their names inserted in what might be called the "Roll of Honor of the Ohio Gas Light Association." Certainly the work is marvelous.

Mr. Doherty—I had hoped to have a digest of the Question Box prepared so that we might discuss it easily in that way.

Mr. Doty—My friend on the right (Mr. Butterworth) is a perennial joker, and he has just expressed the hope that Mr. Doherty will not "Die just yet." (Great laughter.)

Mr. Doherty—I feel very much complimented, Mr. Chairman, but I fear there are others who might have the opposite wish. (Renewed laughter.)

Discussion.

The following oral discussion on the contents of the Box was then had:

No. 214.—"Do not manufacturers of gas and gasoline engines give preference to gasoline over gas; if so, why?"

Mr. Osbourne—I would like to have the Editor's comment on that.

Mr. Doherty—On the question as to whether the manufacturers of gas or gasoline engines do give preference to gasoline over gas, I will say I think they do. No one is so situated but they can use gasoline, although often they are so situated that it is a disadvantage to them in getting insurance if they use gasoline. Engine manufacturers might simplify their methods of doing business and simplify the construction of the engines if they could build their engines for gasoline and gasoline alone. A great number of small internal combustion engines use gasoline because they are remote from cities and towns where they can obtain gas. They are used now by the farmer instead of wind mills, and are used for various purposes.

No. 219.—"Is there any successful method of preventing alkaline deposits in independent water heaters, without decreasing the efficiency of the heater?"

Mr. Doherty—I received only one response to that question, and I would disagree with Mr. Humphrey in his statement that water in a circulating heater is raised to a temperature of 200° F.

Mr. Osborne—I would like to ask if any of the members have had any trouble with any other deposits in their circulating heaters?

Mr. Donald McDonald, Louisville, Ky.—One good turn deserves another, and I will say for my friend Doherty's benefit that I have opened the stopcock where a circulating water heater was used and have drawn steam for 2 minutes. (Laughter.)

Mr. Doherty—That heater was probably put up in one of Mr. McDonald's original ways. (Renewed laughter.) The water heaters now on the market do not raise the temperature of the water to exceed 50°, and it is simply a question of the freedom of circulation through the water heaters. If your heater is set low and it has free connections, you

may not get a rise in temperature of over 20°. That is, the water will circulate so rapidly through it that the heat from the gas will not increase in temperature more than 20°.

No. 401.—"What is the best time in the year for gas men to leave their plants to attend a convention?"

Mr. Doherty—That is something we ought all to have views upon, Mr. President.

The President—It is certainly a very timely subject.

Mr. Stone—Speaking personally, if we could control the weather man almost any time of the year would suit me. But I do not feel as though I should leave the plant with which I am connected in cold weather when we are having difficulties by reason of frost and that sort of thing. Heretofore March has been a month that was all right because it came just immediately after the cold weather and before we really had begun our spring work. This year, however (I do not know whether it was because the winter has been longer or what reason), has been hard for the gas manager to get away in order to attend the convention. I felt that there were responsibilities devolving upon me which I felt ought not to be neglected. I was wondering whether April would be a better month than March. It would be a trifle later and still early enough so that the different gas companies would not have commenced their construction work for the spring and summer months.

Mr. Osborne—Just a personal matter is the reason that I would suggest August. I have troubles of my own which happen at other times. The spring of the year seems to everyone else the best. August just happens to be a time that would best suit me, for a certain reason which I do not care to state. However, the spring of the year, or about the time we have selected, seems to be all right. It is before spring work begins and after the winter troubles are over.

Mr. Knight—The Wisconsin, Michigan and New England Associations this year, I believe, all meet on the same day. That should not be; but it is an evidence they consider that time of the year about the right time.

The President—Michigan has changed its time to meet in the fall, I believe.

Mr. Knight—They are to meet in September, I think.

Mr. Coombs—For one, I am in favor of changing the meeting to a later date. Men connected with gas companies have to take care of a good deal of street work, which work is generally demanding attention about the time this convention meets. I nearly had to stay at home this time. However, I am only one member and would not ask that the time be changed on my account. Speaking with reference to my personal convenience, however, I would like to see the date changed to either May or September.

The President—What is your opinion, Mr. Doherty?

Mr. Doherty—My opinion is, Mr. President, that the best time of the year is after the peak of the load is passed, before construction work opens up, and at a period sufficiently early to permit the adoption of any new business plans that may be brought to our attention at the convention. It is often desirable also to put off the purchase of stoves until you can meet with your friends at the convention. It seems we have selected the most appropriate time for our meeting, unless perhaps it would be better to have it a month earlier. A little later in the spring our new business campaigns open up. We are busy selling stoves and setting them, and we want to devote our entire energies to business while it is harvest time. All during the summer construction work is going on. The load is increasing, and it has always seemed to me a bad time for the engineers and construction men and the managers to leave their plants at such time. From my observation I think February or March seems best month, and possibly February would be better than March.

No. 404.—"What precautions should a gas company take to secure absolute ownership of services put in on consumers' premises, so it would be impossible for a competing company to make use of them?"

Mr. Knight—I am inclined to think you could protect yourself by having a mortgage upon them made a matter of record. But you would have to pay for it. You would have to give some consideration, I think.

Mr. Doherty—I think Mr. Knight is right that a mortgage would protect you, at least as far as ownership is concerned; but it is a question in my mind whether you could maintain your ownership if the property holders or another company wanted to confiscate it. I think you would only have a claim for damages. The only complete protection to the gas company would be absolute ownership whereby they could prevent a competing company from buying the service. People do not want their lawns torn up a second time to put in a new service. I am inclined to think there would be danger of confiscation unless you could anticipate it and have it enjoined. Then it is up to you to go after them for damages.

The President—Has that case ever been tested, Mr. Doherty?

Mr. Doherty—I do not know. The scheme I spoke of here is a scheme followed by a gas company in which I am interested, which puts these matters on record. A foreign trust company can go into the federal court and say that they have been given a mortgage on that service pipe and that the usual process has to be gone through to get it from under that lien.

The President—I had an impression it had been decided that no other company could take possession of the pipe belonging to another company which contained gas, up to the point at which the cock was set.

Mr. Osborne—That would be as great an offence as it would be for a prospective consumer to cut the pipe or interfere with it in any way.

No. 414.—"What kind of a light is best for a meter reader or inspector to carry?"

Mr. Stone—None of the methods suggested appear to me very satisfactory. Our meter readers seem to consider the electric flash light rather unhandy. It may be they are not as skillful as some others, but they say they find considerable trouble in holding it under the arm and doing the necessary work required to read the meter. It occurred to me there might be some other kind of a safety lamp that was better than anything advocated in the Question Box.

Mr. Donald McDonald, Louisville, Ky.—It seems to me the meter reader or inspector ought not to use a safety lamp. If there is any escaping gas I would rather it would be discovered while my man is there than at any other time. For that reason I make my men read our meters by means of a match, and when they read the meters they are instructed to run around the connections to see if there is any leak, or if gas is escaping in the cellar in sufficient quantities to be liable to produce an explosion, If there is, the meter man will notice it a good deal quicker than the householder. If it is not safe enough to light a match it is not safe enough to be left in that condition.

Mr. Robb—I think the reason gas men are looking for a safety appliance is not for the one suggested by Mr. McDonald, but on account of the large quantity of inflammable material material frequently stored in basements where the inspector is required to go in order to read the meter. We all know that matches are liable to start fires, and for that reason we have tried to use the electric flash lamp. We have not found it very satisfactory. Our meter readers seem to prefer an ordinary conductor's lamp which is carried under the arm, thus giving free use to both hands. We have found the conductor's lantern the most satisfactory.

Mr. Butterworth—I think by all means that we should use the electric lamp. I think Mr. McDonald's method is bad practice. I do not think it is the right way at all. I think the meter reader should have a good nose and notice the odor of the gas when it is escaping and report it immediately, but that he should not be permitted to strike a match around the meter under any circumstances. I think Mr. McDonald is "breeding trouble" by any such suggestions.

Mr. McDonald—In order to prevent an attempt on the part of some of my friends in swearing out a writ for inquest of lunacy on me, I would suggest that a good many members of this Association, I understand, are selling natural gas which they claim has no odor, and, therefore, the suggestion of my friend who has just spoken is not applicable. (Laughter.)

Mr. Butterworth—I am sure the members here would interpret, from Mr. McDonald's remarks, that he would recommend his method for artificial gas also.

Mr. Stone—I would like to ask if any member knows of an electric flash lamp that is better than the ordinary cylindrical flash lamp commonly used? The electrical flash lamp would be much more satisfactory if we had something that the meter readers could handle easily. I did not know but that possibly there was a miner's safety lamp or something of that kind.

Mr. Osborne—If meters were placed in accessible places at all times then the problem would not be so hard to solve; but we frequently have to put the meters where the consumers wish them put. Considering the stairways that the meter reader has to go down, and the barrels and other rubbish he has to climb over, it seems to me that a conductor's lantern or something of that kind is the best. I have tried them with very satisfactory results. They give plenty of light and obviate many of the difficulties complained of.

Mr. E. J. Sherwood—I would like to ask Mr. Butterworth if he considers the electric flash light has any advantages over a lantern in regard to igniting gas. It seems to me the flash light would ignite it as quickly as a lantern.

Mr. Butterworth—I should think it does have a decided advantage, Mr. Chairman. I think it is a perfectly safe device for the purpose.

Mr. H. G. Owens—In our town we have natural gas. The electric flash light is not very satisfactory with us. They are rather expensive affairs. As a rule when it comes time to read our meters before we get through reading them our flash light is deteriorated so that very little benefit is obtained from it. Therefore, we use an ordinary lantern. We instruct our meter readers to be very careful, of course, and if they detect gas in going into the basement or any place where it has been closed up tightly they are instructed to investigate first before taking in the lantern.

Mr. E. H. Schnierle—I wish to say that I have had considerable experience in meter reading myself and have used most everything, from Mr. McDonald's matches to Mr. Butterworth's flash light. We find the flash light very unsatisfactory. Its usefulness is limited. We are using a lantern and we get the best results from the use of an acetylene bicycle lamp. It gives a brilliant light. The meter reader can put a bail on top of it and hang it on his arm when he goes down a basement stairs and there is a light ahead of him. If there is any gas escaping he will detect it the instant he opens the door at the head of the stairs.

Mr. Geo. W. Barnes—After a number of years looking around trying to find a suitable lamp from every point of view, which will insure safety, durability and convenience, taking all things into consideration, and after trying almost everything put on the market, including most of the new patents that have come out, we got into communication with the makers of the so-called Humphrey-Davies lamp, Scranton, Pa., and had them put us up a special lamp, a little larger than the miner's lamp, with a bail large enough to hang over a man's arm. We find it will burn all day with one filling of high grade sperm oil. The first cost of the lamp, I think, is possibly something like $7. They will last a long time. They are practically indestructible, except a globe may occasionally break. We have had these lamps in use for a number of years. They have given very good satisfaction. They are absolutely safe. You can get them made in two forms, either with an open face or a bull's eye light. The bull's eye light will give you a focus light at a distance of about 10 feet, covering a space of perhaps 8 feet. We have found these lamps very satisfactory.

The President—Where can they be obtained?

Mr. Barnes—I could not tell you just at present. The ones we had were made at Scranton by a firm who make miners' lamps. They are large manufacturers of miners' lamps of the Humphrey-Davies pattern. They are so constructed as to detect the presence of gas, particularly natural gas, which, to a certain extent, is odorless. When there is sufficient gas in the room to cause an explosion the lamp will tell you of it. It is absolutely safe, very convenient and very durable. We have some of these lamps now that have been in use for a number of years without renewing except an occasional globe which may get broken. I might further add that the lamp we first had made was of a special pattern. I presume that anyone can have them now made from this same pattern. They weigh, I think, about 9½ ounces.

Mr. Doherty—I might comment on that question, Mr. President, by saying that there is one electric flash light made where batteries are separated from the lamp. The lamp is contained in a small lens, not much larger than a No. 18 watch, which is put upon two fingers. You can press them together and you can have your light and still have the use of your hand. It also gives you a larger battery than you could conveniently carry in your hand because it can be put in the pocket or strapped some place on the person. I do not know who makes the lamp. The man who showed it to me was Mr. C. H. Williams, General Superintendent of the Madison (Wis.) Gas and Electric Company. I might say further, in response to Mr. Sherwood's question about the relative safety of these lamps and a lantern, that I have attempted to determine whether an ordinary flash lamp was safe. I have taken it into a dark room and have made the contact, but have never been able to see a spark, so that I think it is perfectly safe. If there were any doubt about it it would be an easy matter to protect it with gauze, on the principle of the Davey safety lamp, where the temperature in going through the gauze would be reduced below the point of ignition.

No. 478.—"Would it be feasible and advisable for gas companies to unite in the adoption of standard sizes for gas coke for domestic purposes, and for securing the manufacture of base burner stoves adapted especially to these standard sizes?"

Mr. Stone—I am rather interested in this matter. Another question along the same line is, what proportionate price should be asked for gas coke as against hard coal? Some of us are making gas coke in a section of the country where there is a good quality of soft coal at a low price; about the only market we have is as against hard coal for domestic purposes. We find that the ordinary appliances for the use of hard coal are not very well adapted for coke. I will not say they are not a success, but they are not as much of a success as they should be, or the burning of the coke therein does not reach the value it should. There is an enormous production of coke and we should get rid of it in some way and at a good price. If we could get an appliance made for the purpose of burning it in like way that hard coal is burned we could get a much better price for coke and we would be able to raise the price nearly to the level of the former.

Mr. Butterworth—The American Radiator Company are making a house heating furnace, either steam or hot water, especially adapted for the consumption of gas coke. I recently had a conversation with the Manager of the Company. They have gotten the advantage in designing it of experience with a small furnace that has been used for some time in Germany, and I have no doubt personally but that it is as good a furnace for burning coke as there is. I think we should all encourage their efforts in undertaking that furnace. They will be very glad to have the gas companies over the country send them a list of possible users of that stove or of that furnace in their respective cities. In Detroit we are making up a list from the records of our coke solicitors of 1,000 names and addresses to send to the Company, and they promise to send out literature and follow up by mail advertising. By working with the architects, builders, contractors and house owners in our respective communities I think we can do ourselves a great deal of good in this direction.

Mr. McDonald—I think this Question Box and the responses which have been collected by the Editor, together with his comments, comprise one of the most valuable contributions to gas literature that we have yet received. I, therefore, move a hearty vote of thanks to the Editor and that that vote be taken by rising. [Adopted, as suggested.]

The President—This motion has been adopted unanimously and it affords me very great pleasure, genuine and sincere, to notify Mr. Doherty of the adoption of the motion, and to say that he has conferred an inestimable service upon the Ohio Gas Light Association and the gas fraternity at large. It is a work that will live, and it will be of great help to the people who want help. I do not know of anything that a man can do which is more laudable than to give help where it is needed.

Mr. Stone—As I understand, the motion carried with it a request for Mr. Doherty to continue in the work.

The President—We will not request it; we will simply have it that way. We will not permit him to discontinue.

Mr. Doherty—Mr. President and Gentlemen: I want to acknowledge the vote of thanks you have given me, and to say that your hearty support is very greatly appreciated, because the work and labor of this Question Box constitute the biggest undertaking I have ever encountered. If I continue it for another year I want to make a request, and I want every man to feel that he is being addressed personally, to contribute to it the coming year and to induce his associates in business to do likewise. It is very trying to endeavor to get replies and assistance from 1,400 or 1,500 men who are only too apt to say: "This is a pretty good thing, but I am busy and haven't got time to fool with it." The time they would have to occupy in fooling with it would be very little as compared to the work which devolves upon the Editor in collecting these questions and answers.

Mr. Schwarm—I move, Mr. President, that the Ohio Gas Light Association request Mr. Doherty to continue his work for another year.

Mr. McDonald—I second the motion and suggest that the vote be taken by rising.

The above motion was unanimously adopted by a rising vote.

Mr. Doherty—I expect to continue it, gentlemen, and I will certainly do so unless some grave reason comes up to prevent. I now have one man broken in who has been of great help to me, and that is Mr. J. Charles Andrews. His assistance has been most valuable to me, and if anything should transpire which would prevent me from continuing the work he is in a position where he could take it up.

[The Question Box contents will be given through serial chapters in the JOURNAL, in later issues.—EDS.]

Mr. H. B. Harrop then submitted the following

MOTION TO CONSTITUTE A COMMITTEE OF REVISION.

The Editor has effectually disposed of the criticisms aimed at the Question Box, with one exception. The answers elicited by the ques-

tion list are not always to be depended on in point of accuracy, and in many cases they are not so full and complete as might be wished. This is a defect, and it is not clear just how it can be remedied. I am not at all certain that it should be remedied. A genuine remedy would involve radical changes in the Question Box, and to be effective might even have to be carried to the point where the Question Box would lose its very identity. The department has succeeded to date in bringing together a more diverse range of gas lore than any other Association has ever seen, and it has served the double purpose of arousing in gas men a readiness to impart information and a willingness to ask help of others. Comparing this year's issue with the preceding one, a marked improvement is noticed in range, bulk and quality of the matter collected, and there is no good reason why each succeeding year should not show a similar marked improvement over its immediate predecessor. If this is to be continued, the fund of information that will eventually be collected in classified form is simply incalculable. The Question Box as it stands represents one of the most important developments in gas literature in recent years, and if we can remove the element of unreliability, and that without affecting the present policy of this department, we can produce in a very short time an encyclopedic work that will surpass any single venture ever attempted for the advancement of the industry. The plan which I am about to propose will give us a work of reference of unquestionable reliability, perfecting the original object of the department, and without limiting the sphere of activity of the Question Box. I think it may be assumed that the present policy of the Question Box is satisfactory and that it will profit us nothing to tamper with it. What we must do is to turn our attention to the accumulated fund of information, growing in bulk and diversity with each yearly increment—the *past* editions, which have become a part of the proceedings of the Association—and to protect the man who turns to this collection for positive information or advice; that is to say, after each yearly harvest of contributions has been published as received, the material so acquired must be revised, digested and merged into a compendium that will represent everything worth keeping received up to that time.

No one man could do this. No gas man can be expected to know every branch of the industry, and, moreover, the active gas man is too busy making his living or a name for himself. The proposal to which I am leading may be best explained by an illustration. The American Medical Association and the American Pharmaceutical Association each appoint periodically a number of their ablest members to decide on the standards common to their two professions. These men jointly agree on the multifarious subjects brought before them, calling to their aid the best scientific and technical skill available, causing research work to be done wherever necessary, and publishing the results of their labors in the form of a standard book of reference, the United States Pharmacopœia. The physician can prescribe an official preparation, the pharmacist knows what the physician means, the physician knows that the pharmacist knows. The existence of this standard does not tie the hands of either; preparations not included among the standards may be prescribed and compounded; but if an official formula is specified there can be no quibble as to interpretation or characteristics. Every State in the Union that protects its citizens with a pure food law names the Pharmacopœia as the ultimate criterion and the courts recognize its supremacy. Confusion arising from a lack of uniformity is impossible. Another single instance: Many of the products defined in the Pharmacopœia are c. p. reagents used in the analytical laboratory, and of these a goodly proportion are suited to the most rigid analytical work. The chemist can order a "U. S. P." reagent, knowing exactly that that reagent will be, and by turning to his Pharmacopœia he can find the several tests which the reagent must pass to prove that it is "U. S. P."

This Association numbers among its members a large percentage of the foremost gas engineers and managers in the country, and it is growing rapidly and persistently. The enthusiasm and hard work which have marked this present convention as the most fruitful held in America up to this time, prove that the Association is amply capable of undertaking the task mapped out in the motion I shall read shortly. The Committee of Revision should be large enough to be representative but not so large as to be unwieldy. It should include a quota of younger men still in the first flush of youth and energy, on whom the actual work of revision with its accompanying labors of research will devolve, as well as more mature members who have passed on to face large engineering and managerial problems. Some of these latter may be reluctant to join in this work, knowing that their time is already fully occupied, but for the sake of the work and the development of the industry we must have them; let it be understood that all that will be asked of them is to act in an advisory capacity where problems arise that require the ripest judgment.

The Committee should never at any time be concerned with the forthcoming issue of the Question Box; but the past issues should be given a thorough revision, removing the element of unreliability, and supplementing wherever possible with data and further references. The Committee should correspond with the various contributors to the Question Box asking them to co-operate in the revision of their answers. The contributor probably wrote his answer under stress of other work; he has learned more about his topic since then; he has given it more thought and perhaps has experimented further; he may be able to give figures that will bear out and render more valuable what was in the first instance a bare statement. Where topics have only been partly answered, and no more information is available, they can be referred back for further investigation.

Last year a proposition to organize a research section was broached. The President's address this year recommended a Bureau of Information. There is no good reason why these and other departments, if organized, should not work harmoniously with the Committee of Revision. The report of the Committee will grow year by year, as material is drawn from new issues of the Question Box, and ultimately it may even be found desirable to include items from the Wrinkle Department and conclusions from the papers read before the Association, and the report will evolve into a compendium of ever increasing value. Be sure that all this will not tend to fossilize the common practice, but will develop the production of gas into a truly technical industry.

Now, Mr. President, in accordance with the argument just made, I move that the Ohio Gas Light Association constitute a Committee of Revision with powers and duties as hereafter described. The Committee shall consist of a chairman and from 9 to 19 associates, who will be chosen with a view to representing as nearly as possible the best technical material within the compass of our membership. The chairman, appointed by the Association at this meeting, shall select, in conjunction with the general officers, associates from engineers and other active workers in the profession who are known to be experts or authorities in construction, plant operation, distribution, chemical and physical research, manufacture of coal gas, of water gas, of tar, ammonia and other residuals, new business, managerial direction and accounting and record, and such selection shall constitute an appointment by the Association. The Committee as thus organized shall be permanent, the members thereof serving 1 year, or until their successors are chosen.

During the ensuing year it will be the duty of the Committee of Revision (by correspondence or otherwise) to digest, edit and annotate the contents of the Question Box for 1903 and 1904; revising the material as may seem necessary, stamping such matter as rests upon unquestioned scientific fact or unimpeachable experimental data with the seal of authority, and, on the other hand, where difference of opinion is widespread, calling attention to these differences, and reconciling, emphasizing or pointing out the necessity for further inquiry, as each case may demand.

The Committee shall be entitled to legitimate expenses for stationery, postage, printing, etc., under the direction of the general officers of the Association and the usual restrictions applying to committees.

The President—This is a new subject and simply indicates that the Ohio Association has within it those whose minds are working and who are endeavering to do something for the betterment of the business in which we are all interested. (Adopted.)

The President then announced that Mr. William McDonald desired to address the Association briefly in reference to the coming

GAS CONGRESS.

Mr. McDonald—Mr. President: I do not know that I desire to make any extended remarks about the Congress. I hoped that the Congress Committee would be able to have a meeting while attending the convention of the Ohio Gas Light Association; but, owing to the fact that some of the members could not be here, we have been unable to get together. We hope, however, that the Ohio Association will take some active interest in the Congress to be held in St. Louis in June, beginning, I think, on the 15th, and lasting 3 days. I feel sure that I express the wish of the committee, of which I am a member, when I say that it is their hope that any of the members of the Ohio Association who go to the meeting, either of the Western Association or the Congress, and especially the Congress, will come as accredited delegates from the Association, if they so choose. Of course, many gas men are members of different Associations, and they can choose, in attending the Congress, from which Association they will come as a delegate. It is the desire that the officers of the various Associations shall come in the same way.

It is also desired, if the other Associations could see their way clear, that they would make some appropriation towards defraying the expense of the Congress. In the letters that have been written on this subject it has been said that there was no desire whatever on the part of the Congress Committee to ask any Association to do anything that they did not feel like doing, but any moderate sum that the Association might feel willing to contribute towards the expense of the Congress will be duly appreciated. It will also be highly appreciated if the Association will send some of its members as delegates to that Congress. I trust before this Association adjourns it will take such action as in its wisdom seems best towards encouraging the work of the Congress and helping to make it a success.

The President—I would to say to Mr. McDonald that the matter has already been brought officially to the attention of the Association through correspondence with the request that a committee be appointed from this Association to act in conjunction with a general committee. The matter has been arranged to be brought up to-morrow so that no doubt the action will be taken then or a committee appointed which will have power to act on behalf of the Ohio Association in any matters which may affect the Ohio Association.

Mr. McDonald—That being true, Mr. President, I desire to say a word further. I hope that each member of the Ohio Association will realize that the Congress is an event the like of which has never taken place in the United States, and it may be a very great many years before anything of the kind will be undertaken again. It would be a very profitable thing for as many of the gas people of the country as possible to get together at that Congress, and I urge upon the members of the Ohio Gas Association that as many of them as can will attend the sessions.

The President—The invitation is appreciated, and I feel sure that the Ohio Association will do all it can to co-operate in securing a successful Congress. The Congress no doubt will be a notable event and it will be made so largely by the participation upon the part of the members of the various Associations throughout the country.

On motion the meeting was declared adjourned until 9.30 A.M. of the following day.

Third Day, March 18—Morning Session.

The Association was called to order pursuant to adjournment. The President called for the

Report of Committee on Uniform System of Mapping Mains,

which was read by Mr. B. F. Barthold, as follows:

To the Members of the Ohio Gas Light Association—Gentlemen: The great amount of detail connected with the proper mapping of street mains gives rise to large differences of opinion as to just how this work should be done. To describe the various systems is a large undertaking. We have had this matter treated in papers before Gas Associations until we have become familiar with some of them. However, we cling to our own ideas, and are reluctant to give them up for any particular scheme.

You have before you copies of the paper[1] read by Mr. John Hellen, of Grand Rapids, Mich., at the Eleventh Annual Meeting of the Michigan Gas Association, in which he presents the system of recording and mapping mains as followed by his company. It consists of two blue print maps, showing the whole territory to a scale of 800 feet to the inch. On one map are all of the mains, and on the other are the 6-inch mains and larger. For recording details, are the forms as explained in his paper and the insurance maps.

It is better for the large maps that white prints with blue lines be used. One for all mains, one for 6-inch mains and larger, one for drips, giving their location and number, one for valves, and one showing the paved streets.

You have before you two white print maps showing the mains. These are quite clear and, when used in connection with the insurance maps, give an excellent record. On these, the extensions can be placed from time to time.

The drip map is a plain white print upon which the drips are located in red dots about $\frac{3}{32}$-inch in diameter, and then numbered. These numbers refer to the drip record and insurance maps.

When there are a large number of valves, a separate white print should be used upon which the valves are located with a red circle crossed. In most cases there are no valves and a valve map is not necessary. The paving map is another plain print upon which are shown the paved streets, the various kinds of paving designated as follows:

Cedar on board, buff; cedar on concrete, dark brown; asphalt, green; brick, red; cobblestone yellow; macadam, blue.

For recording details an insurance map is used. The scale is 50 feet to the inch. It consists of separate sheets bound in book form, each sheet covering several squares. They show all buildings. Arrangements can be made with the publishers to keep them up to date. A very fine feature of this map is that all services can be placed upon it, showing where they enter the customer's property and buildings.

Where insurance maps cannot be obtained, divide the city into sections, making maps of convenient size with a scale of 50 feet to the inch. You will then have all that the insurance map gives except the buildings. On these maps should be located every main in the street, giving the distance from *property* line and the position of all fittings and drips. The mains should be indicated with dark blue lines, and the sizes marked.

On the large, white print maps the 6-inch and larger should be made with heavy lines. Do not use colors; they fade and become hard to distinguish. Besides, colors do not appeal to everyone. However, if too many colors are not used, a good map can be made. For instance, the 3-inch and 4-inch in orange, the 6-inch in red, and the 8-inch and larger in black, give a clear view of the mains. The large feeders stand out very prominent.

The system of dots and dashes is not good. The best idea in this regard is to have 3 thicknesses of lines: The 2-inch, 3-inch and 4-inch in light lines; the 6, 8 and 10-inch in medium lines; the 12, 16 and 20-inch in heavy lines; the 2, 6 and 12-inch in full lines; the 3, 8 and 16-inch in dot-and-dash lines, and the 4, 10 and 20-inch in dotted lines. For example:

2″ ————	6″ ————	12″ ————
3″ — — — —	8″ — — — —	16″ — — — —
4″	10″	20″ .....

Your attention is called to a white print map of the center lines of the streets. The names of the streets are placed as much as possible at the ends of the street to keep the map clear. On this can be shown the mains, placing them on either side of the center lines, according to the side of the street on which the main is laid. This gives a very clear map to work on and has been suggested for use in laying out a new main system or bettering an old one. For this purpose it is quite valuable.

Your committee recommends the system as given in Mr. Hellen's paper, with the addition of the white print maps as described above. Of course, what will do for a small company will not do for a large one, and vice versa. A large company can and should have a more elaborate record than a small one. Conditions govern the system to use. The one as outlined, however, can be used by the smallest as well as the largest company, except that the small company must get a substitute for the insurance map.

Discussion.

The President—This very valuable contribution is something that will be appreciated, not only by the members of the Ohio Association but by the fraternity at large. There has been a very great lack of available information as to the best way to map the mains in a town. This gives us certainly a very comprehensive statement of the situation, and I am sure it will be of great help to all of us. Are there any comments or any questions to be asked? It is a subject which will develop more as we look over Mr. Barthold's report later on. We are certainly indebted to Mr. Barthold for his excellent work.

On motion, the report of the committee was received and ordered spread upon the minutes, and a vote of thanks was tendered to Mr. Barthold for his work in connection therewith.

The President, in calling for the paper by Mr. F.W. Frueauff, on the subject of

THE DISTRICT COLLECTION OF GAS BILLS,

regretted that the author was unable to be present at the meeting, and asked that Mr. Irvin Butterworth read it, which Mr. Butterworth did as follows:

The plan of reading meters and billing and collecting accounts at three periods during each month was commenced in Denver, November, 1902, and we have, therefore, had the experience of one year to reach our conclusions.

The principal reasons which caused us to change from the former plan of reading all meters at the end of each month, rendering bills on the 1st and allowing discounts to and including the 10th, notifying delinquents on the 15th and shutting off for non-payment by the 20th, were as follows:

1. Our inability to get reliable meter readers on all routes each

1. "The Laying of Mains and Services and the Recording of Same;" Journal, Feb. 29, p. 327.

month. We were unable to take enough men away from their regular monthly duties to gather an efficient corps of readers, consequently we had to employ extra men to fill out. Some would be found quite reliable, and some were fairly good readers, but nearly every month one or two would make a signal failure of their reading, resulting in much of the work having to be gone over by the other men to verify questionable readings. Many meters would be skipped, marked "can't find," and many bills would be sent out which brought the consumer back to the office asking for a re reading, and often mistakes were found in their readings as billed, either in the reading for that month or showing the meter had been under-read the previous month. The public complained that new men came to read the meters each month and they had no confidence in their ability to read correctly. Much time would be lost by new readers in explaining who they were and why they called, and in finding the meters on premises they had not visited before.

2. The marking out and sending of all bills at one time made a rush of work in the office that seriously interfered with careful and accurate work, making more work to be done in a few days' time than could properly be done, and resulting in slow days in the middle of the month when work could not be found to keep all help busy.

3. The majority of our consumers came to the office on the 8th, 9th and 10th of the month; many to pay without comment or protest, some to comment or have explanation made, and some to complain of their bill. It was impossible to give each one the courteous treatment he was entitled to receive. It was hard to get accurate tellers to receive and receipt for payments. It necessitated extra help in explaining away complaints, who could not be as familiar with conditions and reasons as the regular complaint clerk, and who could not give them as much attention as their case might need.

4. The crowds at the office on the last discount days were so great as to make it hard for them to get in line and compelled them to wait unnecessarily long for an opportunity to transact their business.

5. Our salesmen on the floor could not give sufficient time to each possible purchaser who would look at appliances on exhibition as they passed in or out of the office. This we felt resulted in the loss of much possible new business, as a clever salesman is often able to convince them that they are in need of the appliances they are casually examining.

One month before the change was made we attached a slip to each bill sent out, advising our consumers that we had decided to make a change in our plan of billing in order to insure them more satisfactory attention at our office, and advising them of the date when their next bill would be rendered, when payable, and the period of time it would cover; this last point being to forestall any complaints of high bills which would be traceable to the long time covered in the bill.

The next month we arranged a force of men who would read meters, deliver bills, deliver receipted bills, deliver delinquent notices and shut off delinquents, and by arranging a schedule their time is occupied throughout the entire month.

To make up our report of earnings for the first month under the new plan we had to make an estimate of the revenue in the second and third districts, as no readings were taken here until the second month; then we allowed for the amount chargeable against the arbitrary estimate for the first month and applied the balance to the month of December revenue. We feel that the new plan has been an improvement in every respect.

1. We are able to get all meters read promptly and accurately. During the past 3 months we have read an average of 32,000 meters per month, and the number of mistakes discovered averaged 14 per month; there were 12 men reading, or practically but 1 mistake per man per month, and 1 mistake for every 2,285 meters read. With the old plan our mistakes ran as high as 250 in 1 month, and many meters were re-read owing to our lack of confidence in the man reading, which resulted in extra expense in reading and delay in sending the bills.

2. Our office work is now so arranged that we have done away with the rush and dull periods.

One teller and helper are on their work constantly, and require no assistance except on the last discount day in each district, when one other man helps for a portion of the day.

The bookkeepers are now working in three sections. Those in the first district foot their revenue the first two days of the month, post cash, orders, etc., until the 12th, take off delinquent lists and balance sheet on the 13th and 14th, write orders and shut off lists until the 20th, post orders and arrange bills for next month until the 25th, and make bills the last 4 days of each month. Each bookkeeper has about 3,300 meters on his ledger, including both gas and electric accounts in his district, so that they carry two balances for each book. A helper works with the bookkeeper in the making of bills and gives a third of his time to each district, as the time for making bills comes around.

The same plan as above outlined is pursued by the bookkeepers in the 2d and 3d districts, except that they send out their bills on the 11th to 21st instead of the 1st of the month, and follow the same procedure as in the 1st district, but being 10 or 20 days behind.

So far as cost of labor goes, we find the cost of reading mters and delivery of bills has been reduced about 17 per cent. The cost of bookkeeping and billing is practically the same as with the old method, but we are now getting additional data and information from our bookkeepers, such as sales of current by circuits at various rates, etc., without increased cost. The cost of tellers is reduced by the new plan, both in amount paid for wages and in the saving resulting from fewer shortages in cash, which frequently occurred with new and inexperienced men at the pay windows.

3. The public are now taken care of promptly, both at the pay window and on complaints, and the salesmen on the floor have ample time to give to customers who are looking around as they pass in and out of the office.

As the Company's business grows, we will have to make other districts, and eventually will have a list discount day on each weekday of the month. Our meter readers will then read constantly, others will deliver bills constantly, etc. We will then have a uniform number of consumers in the office each day.

Discussion.

The President's call for discussion on the Frueauff paper failed to elicit any questions. On motion a vote of thanks was tendered to Mr. Frueauff.

The President called for the

REPORT OF THE COMMITTEE ON STANDARD SIZES OF COKE,

which was read (in the absence of Mr. C. W. Andrews, Chairman) by Mr. F. W. Stone, as follows:

To the Members of the Ohio Gas Light Association: Gentlemen: Your committee on standard sizes of coke begs leave to submit the following report:

The question of standard sizes for coke is one which involves quite a number of features, differing in various localities, and I feel that the simplest way to bring this matter before your Association is to give you the sizes of the screens which are most generally used, rather than simply the size of coke. The screens which are erected in many of the larger gas works are revolving screens covered with plate iron, punched with openings of whatever sizes might be desired. These screens usually divide the coke as follows:

First opening, $\frac{5}{8}$ to $\frac{1}{2}$ inch diameter. This section takes out the breeze. The second section, which has holes varying from $\frac{7}{8}$ to 1 inch in diameter, removes the pea coke. In the final section the holes are usually from $1\frac{7}{8}$ to 2 inches in diameter, thus separating the nut. That which goes through the end of the screen remains as lump. In this method of screening gas house coke, about one-third is usually removed in the smaller sizes, while $\frac{3}{4}$ or even $\frac{1}{4}$ goes through as lump. If a larger proportion of crushed coke is desired, a crusher is installed, whose opening is about 3 to $3\frac{1}{2}$ inches. When its product is run through a screen of the above size the ordinary egg coke is produced. The coke, therefore, has passed through the $3\frac{1}{2}$-inch opening of the crusher and over the $1\frac{1}{2}$-inch opening, or the last section of the screen. Should ordinary wire mesh screen be used instead of punched screens, the size of mesh is reduced somewhat. These wire screens vary from $\frac{5}{8}$ to $\frac{1}{2}$-inch, from $\frac{7}{8}$ to 1-inch, and from $1\frac{1}{2}$ to $1\frac{3}{4}$-inch, respectively.

Another design of screen is that in which plates are used, punched with oval or slotted holes. These holes are usually from 7-16 to $1\frac{1}{2}$-inch by $1\frac{1}{2}$-inch, $\frac{3}{4}$-inch by 2-inch and $1\frac{1}{2}$-inch by 3 inches.

The result of the use of the various screens has been to establish the three grades of the following standard sizes: Pea, over $\frac{1}{2}$-inch and through a 1-inch; nut, over a 1-inch and through a $1\frac{1}{2}$-inch to 2-inch, depending on the grade of coke desired, it varying in various localities; and, finally, egg coke which goes over a $1\frac{1}{2}$ to 2-inch and through 3 to $3\frac{1}{2}$ inches. Respectfully submitted, C. W. ANDREWS, for Committee.

On motion the report of the Committee as submitted was received and ordered spread upon the minutes of the Association, and a hearty vote of thanks was extended to the Chairman for the many valuable suggestions contained therein.

REPORT OF COMMITTEE ON NEXT PLACE OF MEETING.

The President called upon Mr. Steinwedell for the report of Committee on Next Place of Meeting.

Mr. Steinwedell—I would like to say as a preface to our report that

the Committee tried to get an expression of opinion from the various members present as to the place where the members would prefer to have the next meeting held. The Association has become so large that it seems there are only three cities in the State (Cleveland, Cincinnati and Columbus) having hotel accommodations sufficient to accommodate the membership. As we met at Cincinnati last year and at Columbus the year before there seemed to be quite a sentiment for going out of the State, if we did not go too far. As a great many new members were recently admitted, and as a great many of them will attend next year's meeting, we thought we ought to be housed pretty well, and at the same time be conveniently located so that everyone could attend. In selecting the place we have selected, we also took into consideration the matter of railroad facilities. With these remarks, I will submit the following report:

To the Ohio Gas Light Association: Gentlemen—Your Committee on Place of Next Meeting begs to report that it recommends Pittsburg, Pa., as the most suitable city. W. E. Steinwedell, J. J. Knight, } Committee.

On motion of Mr. Butterworth the report of the committee was adopted.

At the request of the President, Mr. Irvin Butterworth presented the following

Report from the Committee on President's Address.

Cleveland, O., May 17, 1904.

To the Ohio Gas Light Association—Gentlemen: Your Committee on President's Address desires to commend it for its dignity and optimism, and for expressing much of value and importance in comparatively few words, especially in the way of encouragement and helpfulness for the future of our Association and of the gas business in general.

The suggestion as to the possibilities for adding greatly to the profits of gas companies by the development of the use of gas for industrial purposes we regard as extremely timely and important, and we recommend that all gas managers give this branch of our business more attention than heretofore, and especially that earnest thought be given to the devising of some equitable system of charging for gas that will enable gas companies to secure a larger amount of this most profitable class of business than our present methods of charging will permit.

We also recommend that our Association carry out our President's suggestion as to the establishment of a Bureau of Information for the benefit of our members, and that the Executive Committee proceed at once in accordance therewith, appointing a proper Chief of such Bureau, and prescribing suitable rules for its operation.

Respectfully submitted, Irvin Butterworth, Isaac C. Baxter, G. N. Clapp, } Committee.

The Secretary—Gentlemen, you have heard the report of the Committee on President's Address. What is your pleasure?

On motion the report was received and its recommendations concurred in.

(To be Continued.)

Some Remarks Upon Causes of Breakdown in Electric Motor Installations.

By "A. H. M.," in *Elec. Engineer.*

That accidents will happen and repairs from time to time become necessary to all classes of machinery is beyond dispute, but as far as the direct current motor is concerned, the trouble might frequently be avoided by the exercise of a little extra foresight with regard to the details of the installation. How much depends upon mere details, both with reference to the construction of the motors themselves and also the accessories, will probably be made painfully manifest when the machinery has been running for a short period under working conditions. By the expiration of a few months an employee will certainly have found an opportunity of getting a spanner or other equally undesirable article firmly jammed between the armature and pole piece of the open type motor which has so far given no trouble, and this expensive mishap will bring out the advantages of the protected ventilated type with considerable distinctness.

Then, again, those shunt windings (the writer has seen many such) merely insulated from the pole piece by a few turns of paper and cotton cloth will suddenly develop an earth to the framework, and as a result the field coils must be entirely removed. This points with no uncertain finger to the necessity of a bobbin of hard fiber or similar suitable material for winding the coils upon. With regard to these bobbins, it is highly important that the end disks and connecting sleeve shall be in one piece, or at any rate shall be so joined that oil or moisture cannot find an entrance, as damage to the coils will often make a start at this point if moisture finds its way in. The last few outside layers of wire should also be saturated with a highly insulating and waterproof varnish, forming practically a dampproof skin over the whole. The above remarks with regard to insulation will also apply in some cases to the armature, the writer being conversant with several machines in which the insulation between the armature disks and the winding is quite insufficient to stand the test of time, although a really fabulous voltage may have been employed in testing previous to leaving the maker's works.

Or, again, trouble may arise because for some reason the armature of motor No. 3 refuses to revolve, even when encouraged by the application of a current immensely in excess of the carrying capacity of the windings, and when by steadily reinforcing the conveniently handy fuses the attendant at last succeeds in burning out the armature, the machine will be overhauled and the alarming discovery made that the nut provided to hold the commutator in position has worked loose and jammed back against the framework. An additional thin lock nut or even sunk set screw would have saved all this damage. Many a disaster amongst electric motors has been caused by the accidental dragging out of the shunt lead from its terminal. This is one of the most inexcusable of accidents and is directly attributable to the use of ordinary set screw terminals. Set screws have a habit of working loose in time, especially when subjected to the constant vibration attendant upon the running of an electric motor. Even when firmly screwed down the grip is of a poor mechanical character, and for this reason the shunt lead should not be less in section than $\frac{7}{8}$ S.W.G., and the end should be thoroughly soldered into a thimble and loop, and the loop fitted over an upright threaded terminal, and held firmly by means of a spring washer and a winged nut. It may be added that a large winged nut and a hard bronze spring washer fitted to an upright threaded brass stud form a most excellent terminal for the main current leads as well as the shunt.

The running parts of motors are often unduly strained, especially where a direct drive by toothed gearing is employed, by allowing too large a starting torque with the starting switch arm on the first contact. This is, of course, due to the fact that the total resistance of the rheostat is too low. Probably, in the majority of cases, the starting current required exceeds the full load current by about 50 per cent., but that is no legitimate reason why such a rush of current should pass through the armature all at once. A properly designed rheostat should have its resistance so graduated that about half a full load current will pass with the starting arm on the first contact, full load current on the second, and then, providing that the motor has not started, the current should rise to about 50 per cent. excess on the third contact. Even when the motor does not start with the first two sections of resistance, cut-out work is being done, as the current passing through the armature is tending to move it, and the next rise of current will start the motor without undue shock or strain.

The original cost of an installation is often unduly increased by the employment of motors of the totally inclosed class, owing to the low efficiency of such machines from overheating. There are, of course, cases in which it is necessary to use the totally inclosed type, but the protected ventilated motor would often be equally as suitable for the work and far more economical. Improper connections between the starting switch and the motor are sometimes responsible for damage, especially if the shunt wiring is not properly connected. The writer has seen several instances in which the shunt lead is taken direct from the double pole switch to the motor terminals. This is quite wrong, as upon opening the double pole switch the shunt circuit is suddenly opened, and a great strain thrown upon the insulation. The lead for the shunt terminal of the motor should always be taken from the first contact of the armature starting resistance, and upon breaking circuit the shunt discharge will expend itself in discharging through the main resistance. The type of starting switch selected for use in the installation will exercise an immense influence upon the satisfactory, or otherwise, working of the plant.

Starting switches are generally described in makers' lists as a given horse power and a given voltage. It would be far better if a further sub-division were made classing the switches for heavy and for light duty. A certain starting switch may satisfactorily start a motor of given horse power and voltage, but may at the same time be utterly unsuitable for continuous and heavy starting work such as starting apparatus is called upon to perform in large engineering works. When the motor is to be frequently stopped and started, and the starting load uncertain, and likely to reach a large excess current, it is absolutely imperative that the carrying capacity of the resistance shall be ample to meet emergencies, otherwise continual expense and annoyance will

follow. For the above heavy duty it is necessary to provide contacts of the renewable segment type, and the contact maker should be of ample area.

One other point, which cannot be too frequently driven home, is the absolute necessity of providing reliable fuses in each motor circuit. They are a perfect safeguard, and, where omitted, a heavy bill for repairs and stoppages will mount up swiftly and surely.

The extent to which electric driving has been adopted during the last 5 years is ample evidence in establishing its superiority over the older forms, and it would indeed be a pity to hinder its further rapid progress by lack of attention to small matters, which may amount to a great deal in the formation of the user's opinion of his installation at the end of year.

Internal Combustion Motors.[1]

[A Lecture by MR. DUGALD CLERK, before the Institution of Civil Engineers, England.]

Twelve years ago the Institution of Civil of Engineers established an annual lecture in memory of Mr. James Forrest, who had long and ably served the Institution as Secretary. This year's lecture was delivered by Mr. Dugald Clerk, who selected for subject, "Internal Combustion Motors." In opening, the lecturer said that during the past 25 years engineers had applied internal combustion motors to all manner of uses, in powers ranging from the tiny ½-horse power motor to the huge 2,000-horse power engine. They had adapted the motors to the consumption of many different kinds of inflammable gases and vapors, and they had continually increased both mechanical and thermal efficiency, until, at the present time, these motors competed with steam in almost every field. At first these motors were practically limited to the use of town gas; and, although the heat efficiency was much superior to that of steam, yet the gas fuel was more expensive per heat unit than the cheaper coals which could be used under steam boilers. This led to the application of producer gas by Mr. Dowson which extended the gas engine field by reducing the cost per heat unit to less than half that of coal gas; and the demonstration by Mr. B. H. Thwaite, in 1895, that the so called waste gases from blast furnaces could be used in gas engines had led to the introduction of the very large gas motors now becoming common both on the continent and in this country.

Much had been done, but more still remained to be done before finality could be said to be even app roximately attained. By means of an elaborate series of diagrams the lecturer showed what had been done up to the present time; and in reference to this he remarked that the fixed engines of moderate power might almost be considered as having reached a standard type, while the large gas engines were still in a state of rapid flux, as to cycle of operation and details used in carrying out the cycle. In all internal combustion motor construction lift valves were now quite universal, the slide valve having entirely disappeared. As to the number of impulses given to the crank, this was now entirely a matter of arrangement; engines such as the 500-horse power "Crossley" were very usually arranged to give two impulses per revolution to the same crank, just like the steam engine.

Comparing the heat efficiencies of 1882 and 1900, the lecturer said that they showed a steady increase. In 1882 the heat converted into indicated work was only 16 per cent. of the total heat given to the engine, and this had risen to 28 per cent. in 1898 and 1900, as shown by tests of the "Crossley" and "National" engines. Higher efficiencies than these were claimed, and it might now be accepted that heat efficiencies of 30 per cent. and slightly over had been really attained by these enginss. The heat rejected in the water circulation had been steadily diminishing, and it reached a minimum in the large "Crossley" engine tested by Mr. Humphrey, where the heat lost to the water jacket was only 24.2 per cent. of the whole heat supplied. In 1882 and 1884, the tests of Slaby and Thurston showed heat rejected in water circulation as 51 and 52 per cent. An examination of the heat rejected in the exhaust, on the hand, showed a tendency to increase, the recorded tests showing an increase from 31 per cent. to practically 40 per cent.

So far, heat efficiencies had improved from 15 per cent. to 30 per cent., and, without doubt, further improvement in efficiency would be made; but with present knowledge it would be impossible to say that the next 20 years would carry us from the 30 per cent. efficiency of today to, say, a 60 per cent. efficiency. But that efficiencies could be increased much further could not be doubted.

Having explained at considerable length the use of an air engine as a standard of comparison for internal combustion motors, the lecturer explained that it was evident from the comparison that diminution of compression volume meant increased efficiency, that large engines approached more nearly to the standard efficiencies than small ones, and that loss was occasioned by high flame temperature and by improperly disposed cooling surfaces. The lessons of the simplified standard engine of comparison were very clear, and gas engine constructors had noted that among all uncertainties there came out the certain fact that the higher the compression—or rather the compression space relatively to the cylinder volume—the greater the economy to be obtained from the engine. They had seized upon this fact, and the past 25 years of English and continental practice had shown steadily increasing compression. Improvement in this direction might be considered as due to bettering the conditions of the thermodynamic cycle; but another line of improvement was also open, and that line was to reduce the heat losses to the lowest possible point. All internal combustion motors suffer large heat losses because of the contradictory requirements of the practical cycle. The cycle required a charge of working fluid first as cold as possible, then compression of that charge without heat loss or gain, then combustion producing high temperatures, succeeded by expansion, also without heat loss or gain. In an ordinary internal combustion motor of medium size these opposite conditions followed each other in the same cylinder at intervals of about one-sixth of a second, and in a high-speed petrol motor at from one twentieth to one-fiftieth of a second. It was, therefore, impossible to arrange cylinder conditions to minimize heat flow, because any attempt to keep surfaces hot to prevent heat loss at once introduced heat into the working fiuid at a time when it should remain cold. Some heat loss, therefore, from the hot gas to the relatively cold walls was unavoidable. This loss, however, became less and less with increase in the dimensions of the engine.

The great limiting element in all internal combustion motors, so far as high compressions are concerned, was pre-ignition. In small engines pre-ignitions were rare and were not dangerous; in large engines they were, unfortunately, somewhat frequent, unless mean pressures were kept down and extensive cooling adopted, and when they did occur they were somewhat dangerous. In small motors the better the surface arrangements the better for the economy of the engine; but in large engines the practical point was the more important point, so that cooling surfaces were deliberately increased for the purpose of reducing this difficulty. "While on this point," remarked the lecturer, "it must never be forgotten that the engineer frequently deliberately abandons the path of theoretical rectitude in order to obtain success in the practical operation of his mechanism. It by no means follows that he is ignorant of this path, as is too often assumed by some of our more theoretical friends."

Proceeding, the lecturer said:

Some time ago it appeared to me possible to reduce maximum temperatures, while increasing mean pressures, by increasing the charge weight per stroke given to an engine. I had experimented with two engines, one of 7-inch cylinder, 15 inches stroke, and another of 10-inch cylinder by 18 inches stroke. These engines, which are of the ordinary standard 4-cycle type, are allowed to take in the usual charge of gas and air, then, at the end of the stroke, a further charge of air or other inert fluid is added to increase the pressure in the cylinder to 7 or 8 pounds per square inch above atmosphere before the return of the piston begins. This has the effect of increasing the charge weight present in the cylinder by about 40 per cent., and of increasing the pressure of compression, without, however, increasing the temperature of compression. Indeed, in both experiments, the temperature of compression was diminished. As the charge present is constant so far as gas is concerned, the maximum temperature capable of being produced is much reduced. The maximum temperature in the diagrams taken by me from these two engines is about 1,200° C. Experiments were made, and it was found that the heat flow was reduced to about two-thirds; and, further, that the mean available pressure was increased about 20 per cent.—20 per cent. more power is obtained with a proportionately reduced consumption of gas. This method of increasing practical efficiency has the merit of reducing temperature all round, and preventing pre-ignitions in two directions, namely, by temperature reduction and also by reducing the average inflammability of the charge, so that it is less readily ignited on compression.

From the lecturer's remarks on the fuel part of his subject the following may be quoted:

"The Dowson producer has been greatly improved upon; and recently a modification, known as the 'Suction Producer,' has been introduced. The great advantage it has is the absence of a steam boiler for blowing, and the absence of a gasholder. The air and water vapor required for gas production is drawn through the incandescent fuel by the operation of the engine itself. This suction producer offers fasci-

1. *Gas World.*

nating possibilities in aiding the application of the combustion motor to marine purposes. It only requires engines now to be built which are able to reverse to apply the gas driven internal combustion motor to marine purposes for very considerable powers indeed.

Dr. Mond's producers can hardly be considered as approximating to the final solution of the difficulties of gas production from bituminous fuels. It will be necessary to design producers which do not depend upon the recovery of ammonia for profitable work. The manufacturer using moderate power units must be catered for by the engineer, and he certainly will require producers using fuel no dearer than he burns under his steam boilers and as small, at least in bulk, as the boiler.

Coal gas was the first to be used for these motors, and it is still the most considerably used fuel. It seems possible now, in view of the incandescent gas lamp, to dispense almost entirely with the intrinsic illuminating power in coal gas; and if parliamentary sanction can be obtained to this step, a very cheap gas could be sold with a very high thermal value. A gas with a thermal value of 500 B.T.U. per cubic foot, sold at 1s. per 1,000 cubic feet, would enormously benefit towns' industries, by providing them with cheaper motive power and cheaper means of heating. No doubt the problem presented can be solved by our chemists, the problem being to produce a gas combining in its properties the flame temperature required for the incandescent mantle and the heating value and low inflammability required for the successful operation of internal combustion motors."

In conclusion, the speaker remarked that the internal combustion motor offered, perhaps, the best instance of international industry which could be imagined. England stood at the head of all nations in the production of the smaller and medium-sized fixed gas engines. She had produced altogether something approaching 100,000 engines of an average of 20-horse power, which was greatly in excess of the whole continental output of engines of this type taken together. On the other hand, continental engineers had given more attention to the large gas engine—engines of 500-horse power and above—and the application of blast furnace gas to the use of the large engine. In this field of internal combustion motor work Germany excelled. In the petrol motors for motor carriages France appeared to take the lead, and in heavy oil engines England led. In America engineers were now giving considerable attention to the internal combustion motor, but, so far, for some reason, the Americans have not shown in this subject the inventive and progressive spirit which they usually displayed.

Mica and Its Applications.

By "J. C. B.," in *Elec. Engr.*

Mica is a substance that is now so very common, that to conjecture as to what would have been the influence on electrical industry had the substance not been a commercial article would be difficult; indeed, as regards electrical progress, mica has always been, as it were, ready at hand to aid any discovery or improvement. On the discovery of the principles of the self-excited dynamo, which marked the advent of both a scientific and commercial evolution, it seems a most fortunate coincidence that such a material should have been to hand, and one that so successfully filled in, so to speak, the interstices of modern progress. Just before this time some practical use to which mica could be applied was being diligently sought after; now, however, what is required are new sources of supply to cope with the multifarious demands for the material. The substance has become now as essential to every branch of electrical engineering as electricity itself seems to be to human progress.

From a geological point, mica, slate and gneiss are the oldest stratified rocks that we are acquainted with. That it was known in past ages is evident from the many marks of ancient operations to be found in mines, and in so many places, for the material was employed for windows, mirrors and ornaments in the early days. In some form or other mica exists all over the earth; tt may be found in granite and quartz, rubelite, green tourmaline, feldspar, lepidolite and many other minerals. It varies in color from white through green, yellowish and brownish shades to black, and its color is greatly influenced by the mineralogical peculiarities of the rock in which it occurs or has been associated, and its commercial value varies also with these circumstances.

One of the most important properties of mica, and one on which its value depends. is the remarkable property of lamination, its structure being so perfect that it is possible to divide it by cleavage into leaves $\frac{1}{10000}$ part of an inch. In consequence of its powerful insulating property, and also the very great advance made in electrical industries, the demand for mica at the present day in almost every country is so great that the supply is almost inadequate. It is not only the superior insulating property of the mineral that gives it such an advantage, but its characteristic and peculiar structure which makes it so adaptable as an insulator, requiring very little machining or shaping. For instance, it is a substance which could not be well replaced as an insulator of commutator segments, for it is not only the best but an efficient insulator under every condition. In the case of the commutator its hardness makes it invaluable, for it wears away under the friction of the brushes nearly at the same rate as the hard-drawn copper of the commutator itself.

Further, the fact that heat has no injurious effect on either its physical structure or insulating property, makes it almost indispensable in armature construction, safety appliances and a multitude of industrial applications, such as lamp chimneys, smoke radiators or preventers, and all purposes where transparency, infusibility and toughness are required. As is the case with the incandescent burner chimneys, it is also taking the place of glass in many respects, especially on board ship, where its combined transparency and tenacity enable it to withstand the wear and tear and the concussion of heavy firing. The qualities of elasticity and toughness are properties in which it is not excelled by anything natural or artificial. These properties are taken advantage of in its employment as an absorbent of nitro-glycerine, and when so used explosions by percussion are rendered less liable, while at the same time nothing is taken from the nitro-glycerine; and for such purposes the pulmose mica is used, or that kind in which the scales are arranged in a feathery form.

The unalterable nature of the substance and its resistance to the corrosive action of acids, smoke and dust, make it also invaluable as a decorative material; the French silver mouldings are made with ground mica, which is accomplished by passing the prismatic or foliated material through a mill, which process increases the bulk, forming a mass of translucent and beautiful bean-like scales. Mica is also now being used extensively as a lubricant, and for such purposes it has no superior, except plumbago; it is likewise employed for boiler covering, as roofing material, and as fireproofing for safes, etc. As a reflector of light it has many applications, for it can be readily stamped into any desired shape. At the present time such reflectors are on the market in very many varieties, being admirably adapted to electric incandescent lamps.

Probably the most interesting and beautiful properties of mica are its optical, which. in connection with polarization of light, are both edifying and instructive. Mica under such conditions is what is called a biaxial crystal, which cleaves perpendicular to the bisector of the angle between the optic axis. Its properties in this respect are used for instructive demonstrations of the property of thin films.

There are so many ways of utilizing scraps and cuttings of this material in the manufacture of other insulating substances, such as micanite, etc., that it is almost impossible to find any real mica that may be pronounced useless.

Correspondence

[The JOURNAL is not responsible for the opinions expressed by correspondents.]

A Well Merited Criticism.

SPOKANE GAS COMPANY,
SPOKANE, WASH., May 10, 1904.

To the Editors AMERICAN GAS LIGHT JOURNAL: I beg to call your attention to two so-called articles in the "Retailer and Advertiser," a magazine devoted to giving good advice to advertisers, but which has been prostituted in the interests of the electric interests of the country. The articles in question appear in the issues of April 7th and 16th. The inclosed is a copy of a letter I have sent to that magazine and is self-explanatory.

The "Retailer and Advertiser" is sent broadcast throughout the country, and if such stuff as this man Bates has written is allowed to pass unchallenged, it will do untold harm to the gas interests which have made such inroads into the business of electric light companies during the past 3 years. I will be glad if, in the exercise of your discretion, you will bring to the knowledge of gas companies by the publication of my letter the methods adopted as a last recourse by our competitors, in order that they may conduct themselves accordingly.

I hope to have the pleasure of meeting you again at the Gas Congress in St. Louis, and in the meantime remain,

Yours very truly, W. A. ALDRICH, Gen. Mgr.

Mr. Aldrich's letter to the "advertising agents" is appended—it is just like him—quite to the point.

To the Editor "Retailer and Advertiser," New York City: Dear Sir: I am in receipt of the Retailer, etc.," for April 7th and 16th, and have read Mr. C. A. Bates's so-called article on "Store Lighting." The ingenuity of the author will not deceive anyone with the average ability of the classified "ad." writer that it is a paid advertisement, and I will go a little further and say that I can come very near guessing who prompted the articles in question. The writer intended communicating with you immediately on receipt of the "Retailer," but concluded that the article on Store Lighting would be followed by another, which presumption has been verified.

The article in question is so diametrically opposed to the truth that the only wonder is you should allow your paper to be used for the purpose of misleading the public, and under the guise of a "copyright article," with such extraordinary statements as are contained in the two issues. To say that the diffusion of an electric arc is simply perfect is nonsense. That arc lights have a "soft, smooth light," is as nonsensical as untrue, and that arc lights cost less per candle power than any other artificial light is a statement in direct contradiction with known facts, and Mr. Bates should be aware of this and not lend himself to what is nothing more nor less than a complete misstatement. He says, "I do not see anyone progressing backward from electricity to gas." Don't you, indeed? Has the gentleman paid a visit to Chicago during the past year and a half? If he had he would see that in that city alone no less than 26,000 "incandescent arc" lights have been displaced with the new Humphrey gas arc. We are progressing backwards so much that during the past 3 years no less than 262,000 gas arcs have been installed, displacing more than 200,000 electric arcs. Progressing backward, forsooth!

There is many a junk pile in the back rooms of gas companies throughout the United States where your "ad." writer can see hundreds upon hundreds of these wonderfully cheap, perfectly diffused, and soft, smooth lights, otherwise incandescent gas arcs as a monument to a fallen idol.

The article in question has simply caused astonishment to your readers, and led them to think that the "Retailer and Advertiser" has lost its independence; that instead of giving good advice in advertising, which is your stock in trade, you have turned into an advertising medium for the purpose of resuscitating this fallen idol.

Does the writer of the article know, also, that electric companies are giving away electric arcs and electric appliances of all kinds in the false hope that they may stay the overwhelming tide that has set in in favor of the gas arc. If not, he can inform himself with very little trouble. Does he also know that the triumph of the gas arc has reached beyond the seas, and that before another year has expired many thousands will be in use abroad also? Does he also know that the cost of the electric arc in comparison with the Humphrey gas arc is more than double? In other words, a so-called 400-candle power electric arc is not sold for less than 4 cents per hour, whereas a 400-candle power gas arc, which *is* absolutely a smooth, soft and steady light, with gas at $1 per 1,000 cubic feet, will cost but 1.6 cents per hour of burning? If he is ignorant of these facts he should have informed himself before writing such stuff as is contained in the article in question.

In conclusion. The article shows malice and partiality, and at the same time discriminates against gas companies and gas appliance manufacturers who annually expend vast sums of money in advertising, and who are patrons of your magazine, and is a decided attempt to hoodwink the public. The article in question is a step backward in the policy of the "Retailer," which has hitherto been a welcome visitor to our houses of business. I shall await your reply in the pages of your magazine to my criticism of the unfair methods adopted by you; no less unfair than untrue. A copy of this letter will be sent to each of your subscribers in this city. Yours truly, W. A. ALDRICH,
General Manager.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

MR. J. N. ENRIGHT has accepted the position of Superintendent of the Washington (Ind.) Gas Company. Many improvements are planned for the Washington plant, notably in respect of main extensions.

THE business offices of *The Engineering Magazine* are now in 140 to 142 Nassau street, New York.

MR. A. F. ELKINS, formerly Cashier of the Hamilton (O.) Gas Light and Coke Company, has accepted the position of Associate Superintendent of the Zenith Furnace Company, Duluth, Minn.

THE Warren (Ills.) Gas Company reports a good increase in business. Main extensions are being arranged for at this point.

HERE are "most" of Governor Odell's reasons for vetoing the Remsen gas bill: "I might well rest satisfied with this official sanction of a matter which so vitally and directly interests the people of the great municipality, were it not for the fact that it seems to be so gross a violation of the constitutional and statutory restrictions which have been heretotore passed upon by the people and enacted by the Legislature for the protection of the streets and the vested rights of the citizens of the municipalities of the State. The dissipation by municipalities of privileges which should have been a source of income as well as protection to them has been the theme and reason for tax upon the Legislature of the State, and directly led to the incorporation of the home rule principles in our constitution.

"It is true that power still rests in the Legislature to repeal or amend such sections of the charter as it may desire. That any action, however, which so flagrantly disregards these rights, of the interests of good local self-government, is desirable, is a question that is not open to consideration, but one upon which the judgment of the people has been foreclosed. It is certainly within the bounds of reason to conclude that the local authorities are better able to judge of the necessities, the powers to be granted, and the compensation to be exacted from local public semi-public corporations than is the Legislature of the State.

"By the Act of 1871 certain rights were granted to the Empire Gas Light Company, which rights it is claimed were in perpetuity, and through various conveyances have been vested in the East River Gas Company. In 1892, by legislative enactment, the East River Gas Company was authorized to lay mains and sell gas in the city of New York. The then city of New York is to-day known as the Borough of Manhattan and a portion of the Borough of the Bronx. If I were satisfied that the effect of the proposed law would be to continue only the rights which had been granted heretofore, then I should not hesitate to give this bill my approval, because I recognize whether the original act was in the direction of sound governmental policy or not, that it did vest certain rights which no subsequent Legislature, except for the grossest abuse of its powers or failure to perform its functions as a corporation, should interfere with or repeal.

"But the new section which this bill proposes to add to the Act of 1892 is so drawn, it is so intimately connected and associated with the Act of 1892, that it cannot be considered apart from it. As a matter of fact, it would not be intelligible, nor would it be of the slightest use, unless read into that portion of the law of 1892 to which it refers. It would have been easy to have incorporated into this proposed new section a reference to the old city of New York by saying, 'In those portions of the Boroughs of Manhattan and the Bronx which comprised the territory hereinbefore expressly granted to the said company.'

"But does it say this, and would the courts give to it this interpretation? It does not say 'in the territory heretofore granted,' but it is 'the territory hereinbefore expressly included,' which is the city of New York. The city of New York in 1892 was but a portion of the city of New York of 1904, and there is such grave danger that the courts might interpret this proposed bill so as to include the whole five boroughs of the city that I feel that in the interests of the public a more specific description should be given as to the extent and scope of the proposed law. And there is no excuse for feigning ignorance on this point, because almost identically the same bill was passed by the Legislature of 1903, and failed to receive the approval of Mayor Low for practically the reasons which I have assigned. If, therefore, no greater rights were sought, it would have been a comparatively easy matter for those having the bill in charge to have so amended it as to overcome the objections to which I have alluded.

"Giving all due weight to the honesty of purpose which actuated the Mayor in his approval of this measure, and with no desire in any way to impugn his motives, I am of the opinion that in approving this bill he has disregarded every principle of home rule and has given greater weight and consideration to the appeals of those who are interested in securing the rights bestowed by this bill than to the almost universally expressed public opinion, which must have been known to him as it is to me. It is my opinion that if an honest effort is made to secure a more businesslike and equitable adjustment of the questions involved in this proposed act as between the municipality of New York and the company which seeks these rights, then a bill that will be fair to both interests can be prepared and such authority vested in the city under it that will render easy a more satisfactory settlement than can possibly be accomplished under this proposed act. It is better to await such action than to approve a measure which is so questionable, even though

the delay may temporarily prevent the removal to Astoria of plants which are now a menace perhaps to the health and property of the citizens of New York.

"In the belief, therefore, that my approval of this measure would be contrary to good judgment, sound policy and the interests of the people. I have determined to withhold executive approval therefrom."

THE proprietors of the Carlisle (Pa.) Gas and Water Company have completed the preliminaries necessary for increasing the capital stock from $100,000 to $200,000.

THE proprietors of the Hamilton (O.) Gas Light and Coke Company and of the Hamilton Otto Coke Company, of Hamilton, have disposed of the named properties to a syndicate of Ohio speculators, whose headquarters are said to be in Cincinnati. Messrs. F. L. Garrison, Joseph Trevor and Howard Rodgers are prominently named in connection with the syndicate. Mr. W. E. Howells, of the United Coke and Gas Company, has been appointed Manager of the Hamilton amalgamation.

THE Salem (Mass.) Gas Company is now comfortably operating its office business from well-equipped chambers in the Kinsman block.

ON the 13th of June the voters of Oelwein, Ia., will be called upon to decide whether a franchise shall "be granted authorizing M. E. Springer and T. H. J. Leckband, their associates, successors or assigns, to construct, maintain, own and operate works within the city of Oelwein for manufacturing, supplying and distributing gas to public or private buildings, persons, firms and corporations, and defining their powers and privileges for the term of 25 years."

A CORRESPONDENT in Indianapolis, Ind., writing under recent date, says: "The Indianapolis Gas Company has begun the erection of a new coal gas plant on its well chosen site, in the northwestern part of the city, whereon its water gas plant and large storage holder are now located. The buildings, coal conveying machinery, engines and exhausters are planned for a make of 3,000,000 cubic feet per day. The benches, condensers, scrubbers, etc, will only be of the capacity of 1,500,000 cubic feet per diem, the other unit to be connected next year. The power to drive all the machinery will be obtained from a 150-horse power engine, connected to a 100 kilowatt generator. De Brouwer's projector and discharging ram will be installed in the retort house, and also his hot coke conveyor. A belt conveyor will bring the coal from the railroad tracks to the retort house bins and coal store. It is expected that gas making will be started by the 1st of November next. Since the supply of natural gas to the city failed, the increase in the output of the artificial product figures out at not less than 30 per cent."

MR. W. E. MOCKETT, General Manager of the Dallas (Tex.) Gas and Fuel Company, has arranged for the construction of a new retort house, planned for the covering of 4 benches of 9's, to be fired on the full-depth system. One bench will be installed at once, the others to follow in close sequence.

THE Gas Department of the Public Service Corporation of New Jersey has published for free distribution an attractively gotten up booklet which has for its title "What Gas Can Do." Its teachings are bound to appeal to many a resident of New Jersey, even to the point of placing hundreds of new names on the Corporation's roll of gas consumers.

AT the annual meeting of the Mechanicsburg (Pa.) Gas and Water Company the officers chosen were: Directors, L. R. Spong, Peter Wertz, A. G. Richwine and Conrad Hamberton; President, L. R. Spong; Secretary, A. G. Richwine, Superintendent, H. L. King.

THE following preamble, memorial and resolutions, respecting the death of General Andrew Hickenlooper, whose fame as a gas man rests upon a foundation that no lapse of time can weaken, were considered and adopted, at a special meeting of the Directors of the Cincinnati Gas and Electric Company, on the afternoon of the 13th inst.:

"*Whereas*, The Board of Directors, at a meeting held May 28, 1903, in accepting the resignation of General Andrew Hickenlooper, adopted a series of preambles and resolutions expressive of their appreciation for services rendered the Company during a period of 31 years, and the high regard in which he is held; therefore,

"*Resolved*, That we hereby concur in the estimate of General Andrew Hickenlooper's worth and services, and regret at his retirement from the management of the Company, as set forth in aforesaid resolutions.

"*Resolved*, Having now learned of the death of our late associate, that the following memorial be adopted, spread upon the minutes, ordered published, and a copy transmitted to the family:

"*Memorial.*—Again this year the angel of death has taken from our official family one of its oldest and most cherished members, General Andrew Hickenlooper, born in Hudson, O., August 10, 1837; died in Cincinnati, O., May 12, 1904. He became a resident of Cincinnati in his early boyhood, became City Surveyor just before the late Civil War. Upon the first call for Volunteers by President Lincoln he organized 'Hickenlooper's Battery,' and rapidly advanced in military life, and finally was made Brevet Brigadier-General of Volunteers. At the close of the war he was appointed United States Marshal for the Southern District of Ohio, which position he held for 4 years, was then elected City Civil Engineer by the City Council, and early in April, 1872, was unanimously re-elected to the same position.

"On April 22, 1872, he was elected Vice-President of this Company, and tendered his resignation as City Civil Engineer. On September 4, 1872, he was elected a member of the Board of Directors, to fill the vacancy occasioned by the death of Henry J. Miller, former President of the Company. On May 8, 1877, he was elected President of the Company as successor to Mr. W. W. Scarborough, who had previously tendered his resignation. General Hickenlooper served continuously as President until May 28, 1903, when his resignation, tendered on account of ill health, was reluctantly accepted.

"During his long service, covering a period of 31 years, he continued, under all circumstances and conditions, to serve the interests of the Company with all the undaunted zeal and force of his nature, the interests of the Company being paramount to all other considerations, his life ambition being to keep it in the front rank of similar industries throughout the world. The result of his untiring efforts in that direction are evidenced by the brilliant record left behind him as an able gas engineer and manager, a keen financier and a man of great executive ability, whereby the affairs of the Company have been conducted on a conservative basis throughout his long and successful career in the service of this Company.

"He was a true and steadfast friend under any and all conditions. He was a most fond and indulgent husband and father, an enterprising citizen, a wise counsellor and staunch friend.

"In him we have lost an able adviser and friend, the community a representative citizen, and his family a gentle, loving husband and parent.

"We tender his bereaved family our heartfelt sympathy, with the assurance that his memory will be held in high esteem by his late associates.

"*Resolved*, That the Board of Directors attend in a body the funeral services of General Hickenlooper, at Scottish Rite Cathedral, Sunday, May 15, 10 o'clock A.M."

WE regret to be obliged to report the death, at the Presbyterian Hospital, Cleveland, O., the morning of the 9th inst., of Mr. Charles Carruth, Cashier of the Cleveland (O.) Company.

JUST prior to leaving the service of the Denver (Col.) Gas and Electric Company, to assume an important position with the Madison (Wis.) Gas and Electric Company, Mr. George Williams was presented by his old-time office associates with an umbrella warranted to shed water. Meanwhile, it is safe to say that "Williams knows enough."

THE Hebraic colony who nestle during the summer in the wilds of the Catskill Mountains in and about Fleisschmann's and Griffin's Corners, N. Y., are considering the problem of installing a central station acetylene plant. Christians are said to be furnishing the capital supply.

THE treasury of the Cambridge (Mass.) Gas Light Company was recently enriched in the sum of 75 cents, paid into it by a man who admitted that he owed the Company the money.

THE contracts for the betterments on the plant of the Knoxville (Tenn.) Gas Light Company have been awarded.

MR. FRANK D. MOSES has begun work on the plant of the Egg Harbor (N. J.) Gas Company. The quick working contractor declares that the residents will have gas by October 1st.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

CHAS. E. SANDERSON,
MANAGER.

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WESTERN GAS ASSOCIATION.
OHIO GAS LIGHT ASSOCIATION.

NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co., 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, MAY 23, 1904.

The Market for Gas Securities.

The market for city gas shares was fairly steady during the week. Consolidated fluctuated quite a bit, the closing to-day (Friday) having been made at 208½ to 209. The convertible bond scheme issue has been perfected. It includes the putting out of $20,000,000 6's, to run 5 years, the same to be convertible into common stock at the end of 3 years, at the option of holders, at par. These rights sold to-day at 17½. The main effect of the issue is to increase the capital of the Company to $100,000,000, meanwhile the underlying bonds having been taken care of. Ten shares of Mutual sold this week at 300. It is worth 600.

Brooklyn Union was dull since last writing, but its dullness is merely the sign of the strength of a sleeping strong one. It closed to-day at 216 to 220, ex-div. of 2½ per cent. Baltimore Consolidated is 68 to 69, the weakness having been caused by the announcement of the Company's intention to issue a blanket mortgage of $15,000,000, at 4½ per cent., to run for 50 years. This mortgage will replace all former issues in time, and provide a trifle of cash to go into other construction work than that indulged in at Sparrows' Point. Peoples, of Chicago, is weak without cause. The general market for gas bonds is strong.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

MAY 23.

☞All communications will receive particular attention.

☞The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	208½	209
Central Union, Bonds, 5's	3,000,000	1,000	106½	108½
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	118	120
Metropolitan	658,000	..	108	112
Mutual	3,500,000	100	270	300
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co.. Bonds, 5's	11,000,000	1,000	105½	106
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	34	..
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	..	..	..
Northern Union, Bonds, 5's	1,250,000	1,000	102½	105½
New York and East River.. Bonds 1st 5's	3,500,000	1,000	109½	111
" 1st Con. 5's	1,500,000	..	106	108
Standard	5,000,000	100	125	13
Preferred	5,000,000	100	145	155
Bonds, 1st Mortgage, 5's	1,500,000	1,000	116	117
Yonkers	299.650	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	216	220x
" " Bonds (5's)	15 000,000	1,000	113	115
Bay State	50,000,000	50	¼	⅜
" income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	28	30
" 1st Mtg. 5's	509,000	1,000	93	96
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	3¾	4
" " Bonds, 5's	5,250,000	1,000	12¾	..
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati Gas and Electric Co	29,500,000	100	100	101½
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	101	101½
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	88¼	89¼
Preferred	3,026,500	100	107½	109
Consumers, Toronto	1,700,000	50	218	225
Consolidated, Baltimore	11,000,000	100	68	69
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	15	17
" Con. Mtg. 5's	880,000	1,000	86	90
Consolidated G. & E. Co.'s. Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co	4,825,500	50	..	50
" Prior Lien 5's	5,603,000	1,000	99½	100
Detroit Gas Co., 5's	351,000	1,000	75	75¼
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	39	40
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	55	..
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	245	265
Hudson County Gas Co., of New Jersey	10,500,000	..	67	68
" Bonds, 5's	10,500,000	..	103½	104½
Indianapolis	2,000,000	..	60	70
" Bonds, 6's	2,650,000	..	103½	106½
Jackson Gas Co	250,000	50	73	75
" 1st Mtg. 5's	290,000	1,000	101	102½
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	90	100
Preferred	2,500,000	100	90	100
Bonds	10,000,000	1,000	109½	110
Lafayette Gas Co., Ind.	1,000,000	100	..	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	136	140
Madison Gas & Elec. Co. " 1st Mtg. 6's	350,000	1,000	107½	108½
" 6 per cent. scrip, due 1910	100,000	25	85	87
Montreal, Canada	2,000,000	100	218	184¾
Nashville Gas Lt. Co	1,000,000	100	110	..
Newark, N. J., Con. Gas Co.	6,000,000	..	56	58
Bonds, 6's	4,600,000	..	105	105¾
New Haven	1,000,000	25	64	70
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	94¾	95½
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	.
Rochester Gas & Elec. Co..	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	15,800,000	100	58½	58¾
St. Joseph Gas Co. " 1st Mtg. 5's	751,000	1,000	92	96½
St. Paul Gas Light Co	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	92	93
Syracuse, N. Y.	1,975,000	100	46	48
Bonds	2,047,000	1,000	94	96
Washington, D. C	2,600,000	20	287½	288¾
First mortgage 6's	600,000	..	..	..
Western, Milwaukee	4,000,000	..	..	..
Wilmington, Del	600,000	50	230	..

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The Western Gas Construction Co., Fort Wayne, Ind. 900

AMMONIA CONCENTRATORS.

Fred. Bredel Co., Milwaukee, Wis. 820
Michigan Ammonia Works, Detroit, Mich. 816
The Gas Machinery Co., Cleveland, O. 820
The Western Gas Construction Co., Fort Wayne, Ind. 900

GAS METERS.

American Meter Co., New York and Philadelphia..... 839
Detroit Meter Company, Detroit, Mich..... 799
D. McDonald & Co., Albany, N.Y..... 837
Helme & McIlhenny, Philadelphia, Pa..... 839
John J. Griffin & Co., Philadelphia, Pa..... 840
Keystone Meter Co., Royersford, Pa..... 838
Maryland Meter and Mfg. Co., Baltimore, Md..... 838
Metric Metal Co., Erie, Pa..... 839
Nathaniel Tufts Meter Co., Boston, Mass..... 838

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American Meter Co., New York and Philadelphia..... 839
D. McDonald & Co., Albany, N.Y..... 837
Helme & McIlhenny, Philadelphia, Pa..... 839
John J. Griffin & Co., Philadelphia, Pa..... 840
Keystone Meter Co., Royersford, Pa..... 838
Nathaniel Tufts Meter Co., Boston, Mass..... 838

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Reeves Mfg. Co., New Haven, Conn..... 820

GAS AND WATER PIPES.

Davis & Farnum Mfg. Co., Waltham, Mass..... 822
Donaldson Iron Co., Emaus, Pa..... 824
Economical Gas Apparatus Construct'n Co., Toronto, Ont. 824
M. J. Drummond & Co., New York City..... 824
R. D. Wood & Co., Philadelphia, Pa..... 834
Warren Foundry and Machine Co., New York City..... 824

GAS COALS.

Berwind-White Coal Mining Co., New York and Phila. 830
Perkins & Co., New York City..... 830
Westmoreland Coal Co., Philadelphia, Pa..... 831

SPECIALTIES FOR OIL AND PIPE LINES.

S. R. Dresser, Bradford, Pa..... 821

GAS MAIN STOPPERS.

Safety Gas Main Stopper Co., N.Y. City..... 824

MAIN AND SERVICE LAYING.

Sullivan Bros., Flushing, N. Y..... 780

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George Light, Dayton, O..... 824
H. Mueller Manufacturing Company, Decatur, Ills..... 818

CANNEL COALS.

Perkins & Co., New York City..... 830

STOKING MACHINERY.

G. A. Bronder, New York City..... 829

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Adam Weber Sons, New York City..... 828
C. W. Hunt Company, New York City..... 821
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Fred. Bredel Co., Milwaukee, Wis..... 830
G. A. Bronder, New York City..... 829
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The Brown Hoisting Machinery Co., Cleveland, O..... 831
The Gas Machinery Co., Cleveland, O..... 830
The Jeffrey Manufacturing Co., Columbus, O..... 830
The Link-Belt Engineering Co., Philadelphia, Pa..... 831
The Link-Belt Machinery Co., Chicago, Ills..... 824
The Western Gas Construction Co., Fort Wayne, Ind... 800

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Stacey Mfg. Co., Cincinnati, O..... 835

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Standard Oil Co., New York City..... 791
Sun Company, Pittsburg, Pa..... 831
The Sun Oil Co., Pittsburg, Pa..... 831

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C. M. Keller, Columbus, Ind..... 831
Fred. Bredel Co., Milwaukee, Wis..... 830
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The Connersville Blower Company, Connersville, Ind... 837

ECONOMIZERS.

Green Fuel Economizer Co., Matteawan, N.Y..... 822

GAS GAUGES.

The Bristol Co., Waterbury, Conn..... 822

GAS GOVERNORS.

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Fred. Bredel Co., Milwaukee, Wis..... 830
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R. D. Wood & Co., Philadelphia, Pa..... 834

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C. L. Gerould, Bloomington, Ind..... 828

RETORTS AND FIREBRICKS.

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Baltimore Retort and Firebrick Co., Baltimore, Md..... 828
Brooklyn Firebrick Works, Brooklyn, N. Y..... 828
Henry Maurer & Son, New York City..... 824
James Gardner, Jr., Co., Pittsburg, Pa..... 828
J. H. Gautier & Co., Jersey City, N. J..... 828
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Missouri Firebrick Co., St. Louis, Mo..... 828
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Geo. G. Ramsdell, New York City..... 818
Parker-Russell Mining and Mfg. Co., St. Louis, Mo..... 818

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Bartlett, Hayward & Co., Baltimore, Md..... 834
Fred. Bredel Co., Milwaukee, Wis..... 830
J. H. Gautier & Co., Jersey City, N. J..... 828
Laclede Firebrick Mfg. Co., St. Louis, Mo..... 828
Missouri Firebrick Co., St. Louis, Mo..... 828
Parker-Russell Mining and Mfg. Co., St. Louis, Mo..... 818

(Continued on page 817.)

DIVIDEND NOTICE.

OFFICE OF THE AMERICAN GAS COMPANY,
222 S. THIRD ST., Philadelphia, Pa., May 18, 1904.

The Board of Directors of The American Gas Company has this day declared a dividend of 3 per cent., or $3 per share, on the capital stock of the Company, payable on and after June 1, 1904. Checks will be mailed.

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MICHIGAN AMMONIA WORKS, - Detroit, Mich.

(*Continued from page* 816.)

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The Western Gas Construction Co., Fort Wayne, Ind... 800

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D. M. Steward Mfg. Co., Chattanooga, Tenn..... 820

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National Paint Works, New York City..... 832

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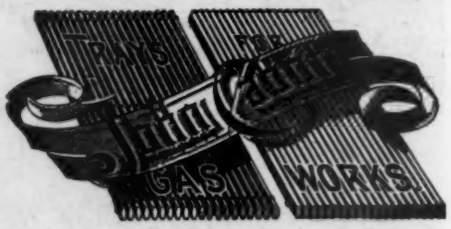

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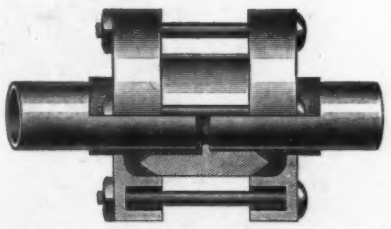
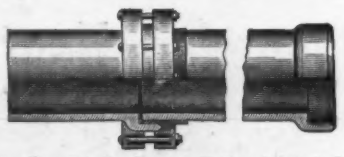


Insulating Coupling for Wrought Iron Pipe. Style 5.



Insulating Coupling for Dresser Bell and Spigot Cast Iron Pipe. Style 6.

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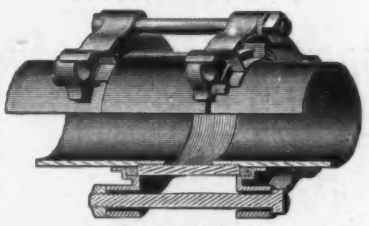
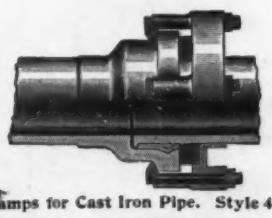


Clamp. Style 4.



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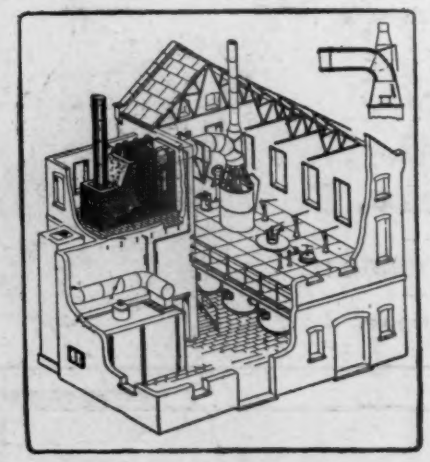

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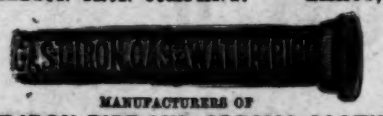

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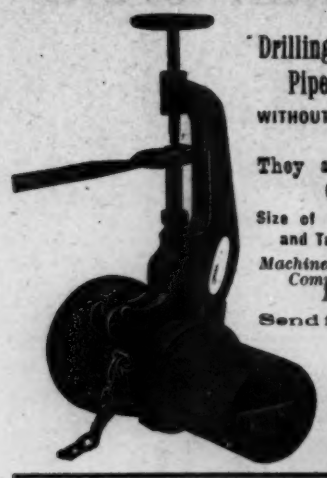

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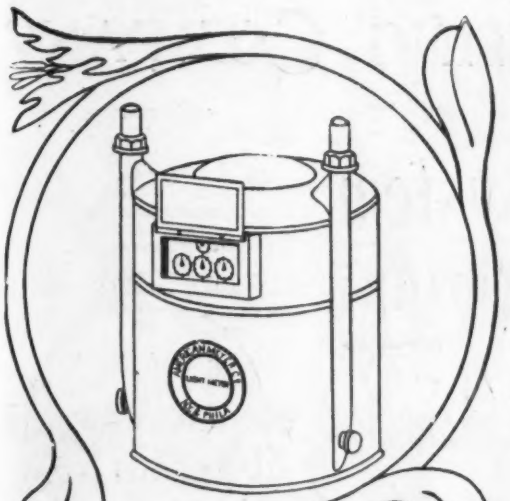
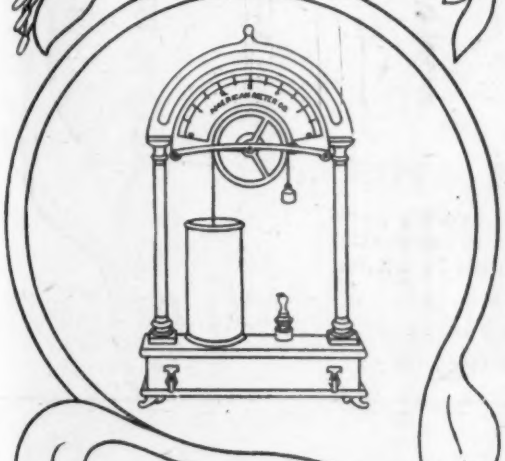
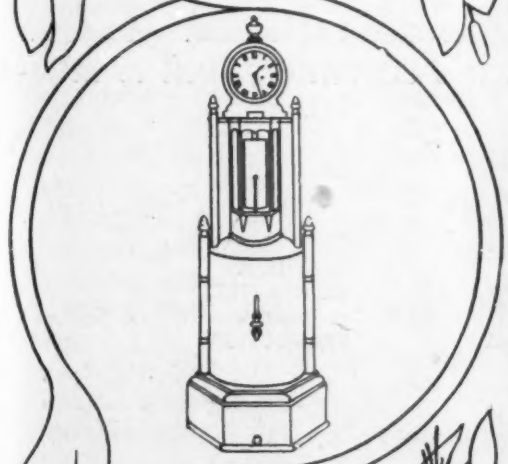
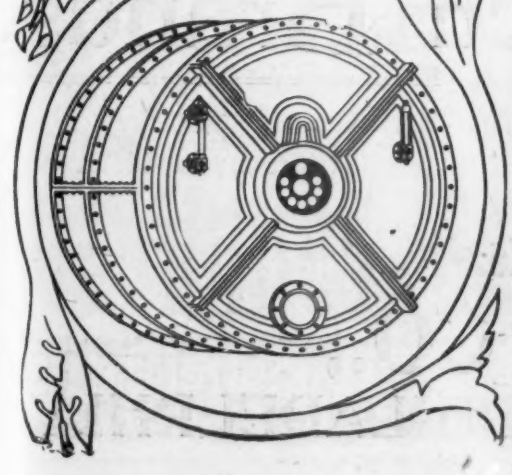








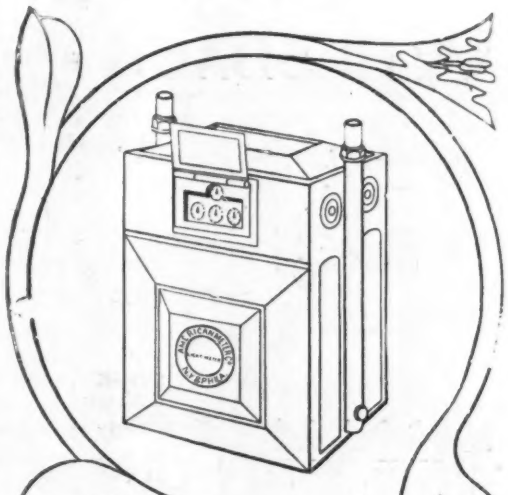
PUBLIC LIGHTING TABLE.

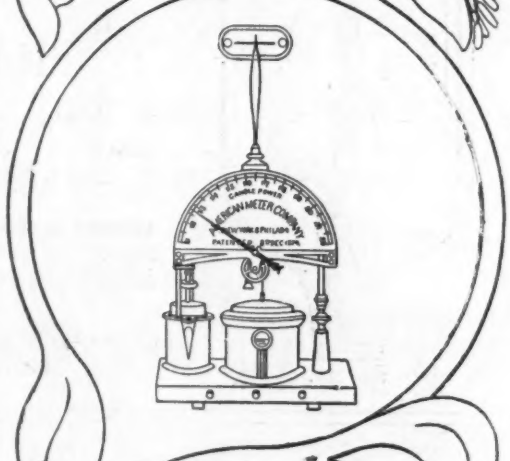
JUNE, 1904.

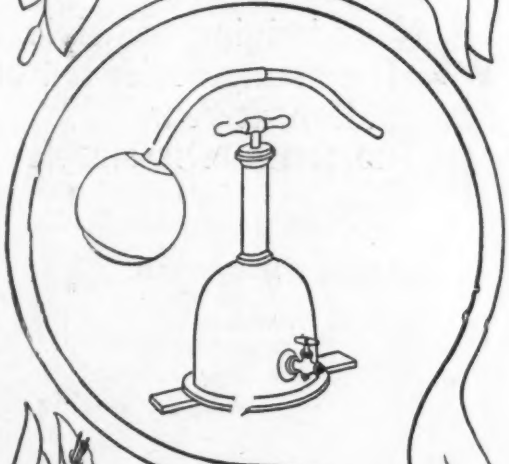
Day of Week.	Date.	Table No. 1. Following the Moon. Light.	Table No. 1. Following the Moon. Extinguish	Table No. 2. New York City. All Night Lighting. Light.	Table No. 2. New York City. All Night Lighting. Extinguish.
				P.M.	A.M.
Wed.	1	7.50 PM	11.10 PM	7.15	3.15
Thu.	2	7.50	11.40	7.15	3.15
Fri.	3	7.50	12.20 AM	7.15	3.15
Sat.	4	7.50	12.50	7.25	3.15
Sun.	5	8.00 LQ	1.20	7.25	3.15
Mon.	6	8.00	1.50	7.25	3.15
Tue.	7	8.00	2.20	7.25	3.15
Wed.	8	8.00	2.50	7.25	3.15
Thu.	9	8.00	3.30	7.25	3.15
Fri.	10	8.00	3.30	7.25	3.15
Sat.	11	8.00	3.30	7.25	3.15
Sun.	12	8.00	3.30	7.25	3.15
Mon.	13	8.00 NM	3.30	7.25	3.15
Tue.	14	8.00	3.30	7.25	3.15
Wed.	15	8.00	3.30	7.25	3.15
Thu.	16	8.00	3.30	7.25	3.15
Fri.	17	8.00	3.30	7.25	3.15
Sat.	18	10.10	3.30	7.30	3.15
Sun.	19	10.50	3.30	7.30	3.15
Mon.	20	11.30 FQ	3.30	7.30	3.15
Tue.	21	12.00	3.30	7.30	3.15
Wed.	22	12.40 AM	3.30	7.30	3.15
Thu.	23	1.20	3.30	7.30	3.15
Fri.	24	2.00	3.30	7.30	3.15
Sat.	25	2.40	3.30	7.30	3.15
Sun.	26	No L.	No L.	7.30	3.15
Mon.	27	No L. PM	No L.	7.30	3.15
Tue.	28	No L.	No L.	7.30	3.15
Wed.	29	8.00 PM	9.40 PM	7.30	3.15
Thu.	30	8.00	10.20	7.30	3.15

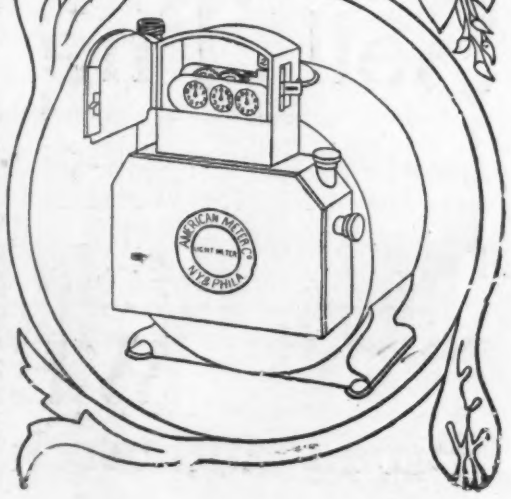
TOTAL HOURS LIGHTING DURING 1904.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	225.00	January	423.20
February	205.40	February	367.40
March	187.40	March	355.35
April	169.50	April	298.50
May	152.30	May	264.50
June	137.20	June	234.25
July	138.50	July	243.45
August	151.00	August	280.25
September	164.40	September	321.15
October	191.30	October	374.30
November	210.30	November	401.40
December	237.10	December	433.45
Total, yr.	2171.40	Total, yr.	4000.00









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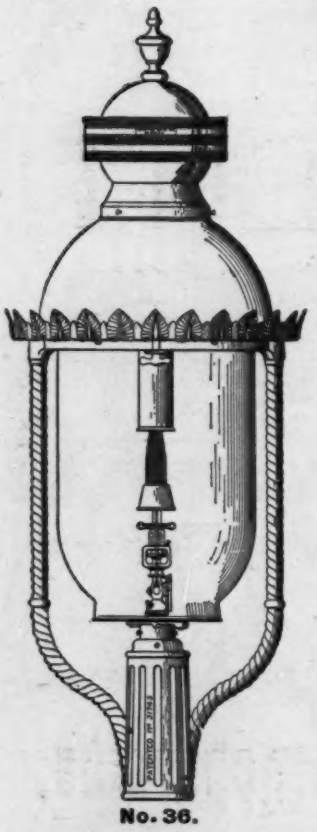
.... OF AMERICA ....



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Canon City, Col.	Charlotte, N. C.	Council Bluffs, Ia.
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Bridgeport, Conn.	Waltham, Mass.	Easton, Pa. (2d contract).
Albert Lea, Minn.	Dover, Del.	Mobile, Ala.
Brooklyn, N. Y.	York, Pa.	Conshohocken, Pa.
Kansas City, Kas.	Minneapolis, Minn.	Mason City, Ia.
Hempstead, N. Y.	Allentown, Pa.	

TOTAL SETS FOR 1903, ... 62
TOTAL DAILY CAPACITY, ... 62,950,000 cubic feet.
TOTAL SETS TO DATE, ... 508
TOTAL DAILY CAPACITY, ... 362,780,000 cubic feet.

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Established 1858. Incorporated 1890.
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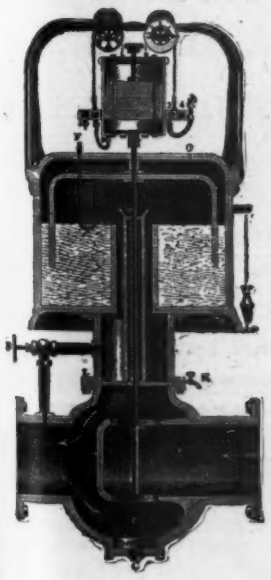

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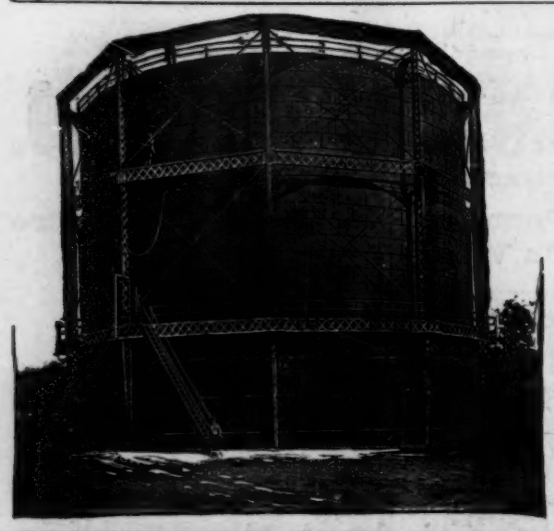

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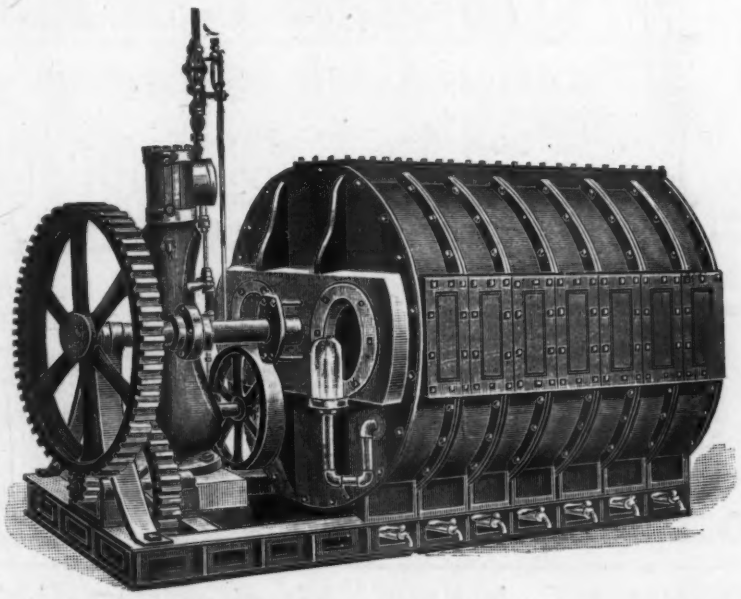

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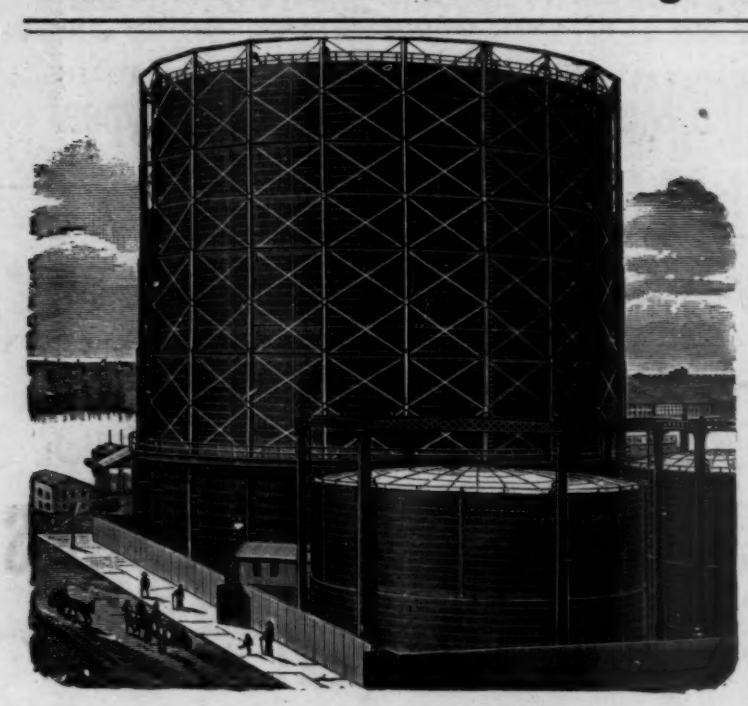

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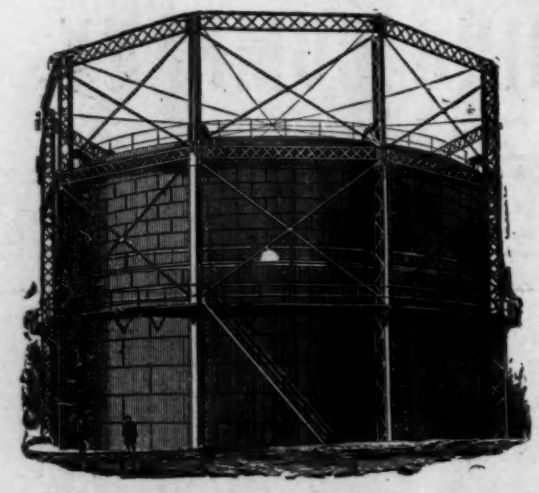

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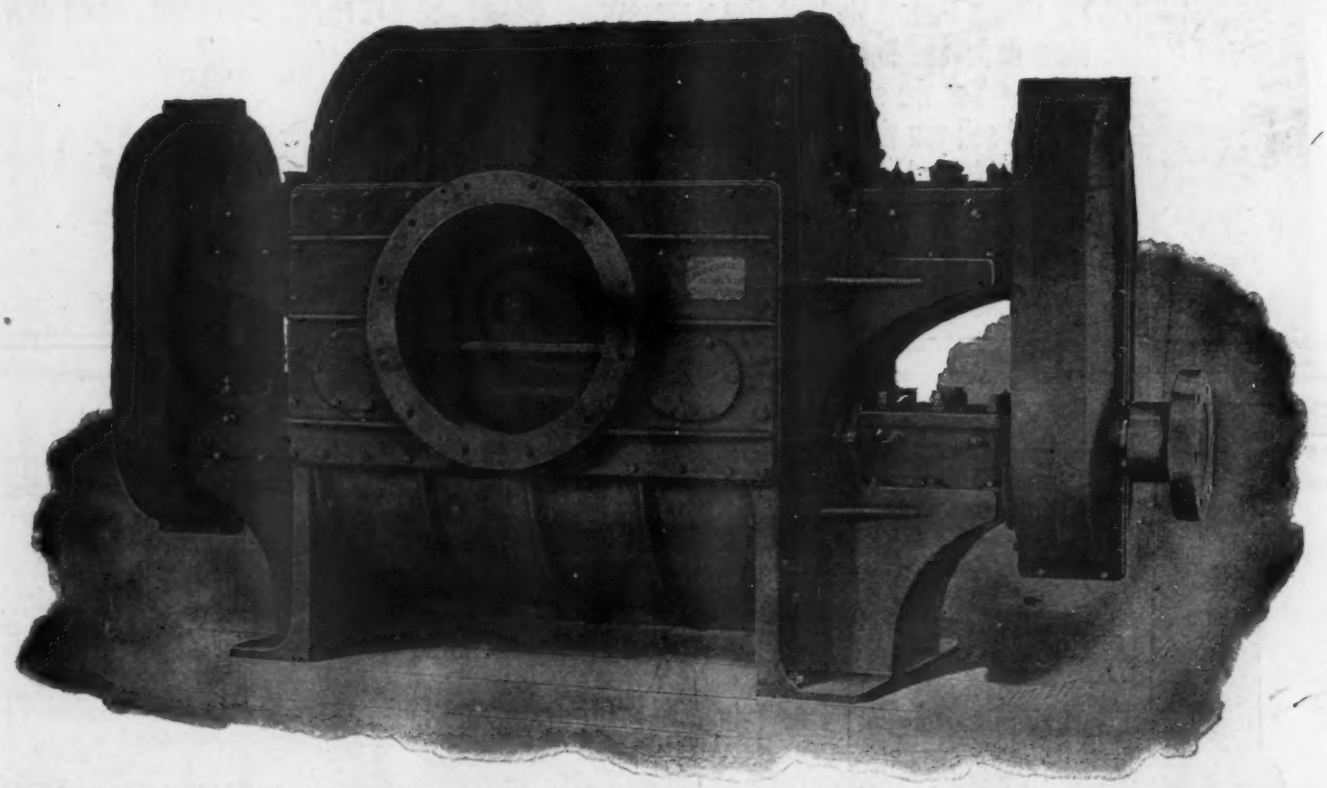

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